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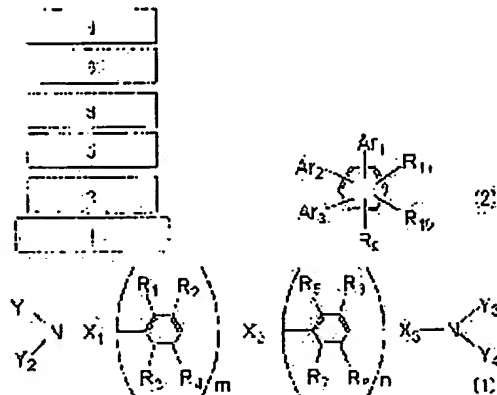
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(54) ORGANIC LIGHT-EMITTING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an organic light-emitting device taking on extremely pure hues, and having a light output of high efficiency, high luminosity, and a long life.

SOLUTION: The organic light-emitting device has at least a pair of electrodes composed of an anode and a cathode, and one layer or a plurality of layers sandwiched by the pair of the electrodes where the layer includes organic compounds. At least one of the layers including the organic compounds contains a compound shown by at least a kind of formula [1] and a compound shown by at least a kind of formula [2].



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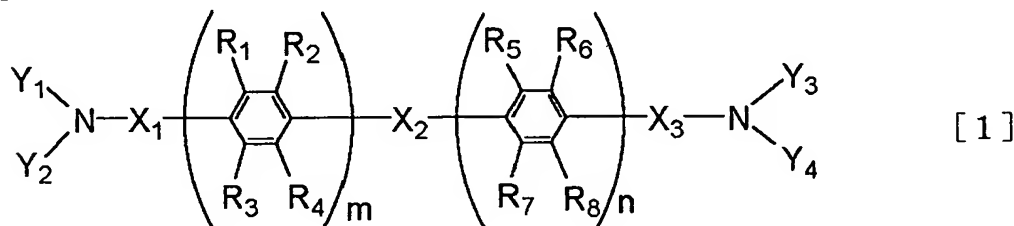
CLAIMS

[Claim(s)]

[Claim 1]

The organic light emitting device further characterized by containing the compound of the layer containing said organic compound shown by at least one kind of following general formula [1], and the compound shown by at least one kind of following general formula [2] at least in the organic light emitting device which has at least a layer containing the organic compound of one layer or two or more layers ****(ed) by the electrode of a couple which consists of an anode plate and cathode, and inter-electrode [of this couple].

[Formula 1]



(X1, X2, and X3 may be the radicals of the bivalence chosen from the group which consists of the alkylene group which is not permuted [direct coupling, a permutation or, an aralkylene group, an arylene radical, and a heterocycle radical, and they may be the alkylene group which has the connection radical which may differ even if the same, and consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, an aralkylene group, an alkenylene group, the amino group, a silyl radical, a carbonyl group a ether group, and a thioether radical.

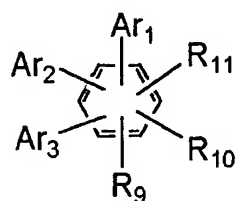
Y1-Y4 The alkyl group which is not permuted [a permutation or], an aralkyl radical, an aryl group, and a heterocycle radical, The alkylene group which is not permuted [the permutation which has the connection radical which consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, or], The carbonyl group which is not permuted [which has the connection radical which consists of an arylene radical which is not permuted / an aralkylene group, an alkenylene group, the amino group and a silyl radical, a permutation, or / or a heterocycle radical of bivalence], It is the radical chosen from the group which consists of a ether group and a thioether radical, and even if the same, you may differ.

Moreover, Y1, and Y2, Y3 and Y4 may be combined mutually, and the ring may be formed, and it may join together mutually and X1, Y1, and Y2, X3, Y3 and Y4 may form the ring.

R1-R8 are the radicals chosen from the group which consists of the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, and an aryl group, and even if the same, they may differ.

m+n is the integer of 0-10.

[Formula 2]



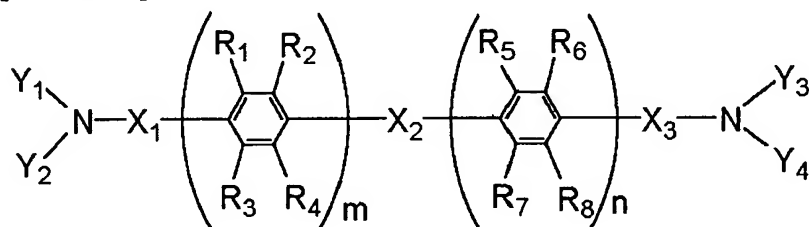
[2]

(Even if the same, you may differ, and Ar1-Ar3 may be the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and any one may be an aralkyl radical which is not permuted [the alkyl group which is not permuted / a hydrogen atom, a permutation, or /, a permutation or].) R9-R11 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or] and an aralkyl radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[Claim 2]

The organic light emitting device further characterized by containing the compound of the layer containing said organic compound shown by at least one kind of following general formula [1], and the compound shown by at least one kind of following general formula [3] at least in the organic light emitting device which has at least a layer containing the organic compound of one layer or two or more layers ****(ed) by the electrode of a couple which consists of an anode plate and cathode, and inter-electrode [of this couple].

[Formula 3]



[1]

(X1, X2, and X3 may be the radicals of the bivalence chosen from the group which consists of the alkylene group which is not permuted [direct coupling, a permutation or, an aralkylene group, an arylene radical, and a heterocycle radical, and they may be the alkylene group which has the connection radical which may differ even if the same, and consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, an aralkylene group, an alkenylene group, the amino group, a silyl radical, a carbonyl group a ether group, and a thioether radical.

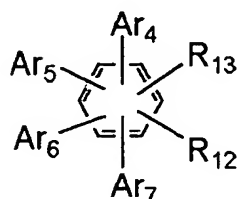
Y1-Y4 The alkyl group which is not permuted [a permutation or], an aralkyl radical, an aryl group, and a heterocycle radical, The alkylene group which is not permuted [the permutation which has the connection radical which consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, or], The carbonyl group which is not permuted [which has the connection radical which consists of an arylene radical which is not permuted / an aralkylene group, an alkenylene group, the amino group and a silyl radical, a permutation, or / or a heterocycle radical of bivalence], It is the radical chosen from the group which consists of a ether group and a thioether radical, and even if the same, you may differ.

Moreover, Y1, and Y2, Y3 and Y4 may be combined mutually, and the ring may be formed, and it may join together mutually and X1, Y1, and Y2, X3, Y3 and Y4 may form the ring.

R1-R8 are the radicals chosen from the group which consists of the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, and an aryl group, and even if the same, they may differ.

m+n is the integer of 0-10.

[Formula 4]



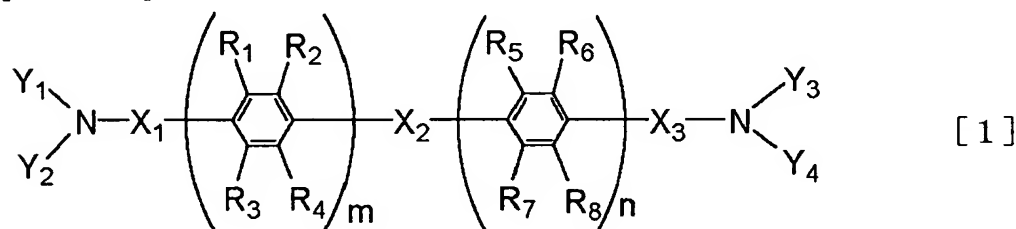
[3]

(Ar4-Ar7 are the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and even if the same, they may differ.) R12 and R13 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or] and an aralkyl radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[Claim 3]

The organic light emitting device further characterized by containing the compound of the layer containing said organic compound shown by at least one kind of following general formula [1], and the compound shown by at least one kind of following general formula [4] at least in the organic light emitting device which has at least a layer containing the organic compound of one layer or two or more layers ****(ed) by the electrode of a couple which consists of an anode plate and cathode, and inter-electrode [of this couple].

[Formula 5]



[1]

(X1, X2, and X3 may be the radicals of the bivalence chosen from the group which consists of the alkylene group which is not permuted [direct coupling, a permutation or, an aralkylene group, an arylene radical, and a heterocycle radical, and they may be the alkylene group which has the connection radical which may differ even if the same, and consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, an aralkylene group, an alkenylene group, the amino group, a silyl radical, a carbonyl group a ether group, and a thioether radical.

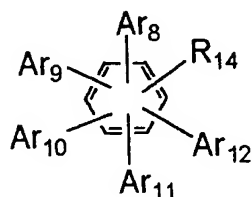
Y1-Y4 The alkyl group which is not permuted [a permutation or], an aralkyl radical, an aryl group, and a heterocycle radical, The alkylene group which is not permuted [the permutation which has the connection radical which consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, or], The carbonyl group which is not permuted [which has the connection radical which consists of an arylene radical which is not permuted / an aralkylene group, an alkenylene group, the amino group and a silyl radical, a permutation, or / or a heterocycle radical of bivalence], It is the radical chosen from the group which consists of a ether group and a thioether radical, and even if the same, you may differ.

Moreover, Y1, and Y2, Y3 and Y4 may be combined mutually, and the ring may be formed, and it may join together mutually and X1, Y1, and Y2, X3, Y3 and Y4 may form the ring.

R1-R8 are the radicals chosen from the group which consists of the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, and an aryl group, and even if the same, they may differ.

m+n is the integer of 0-10.

[Formula 6]



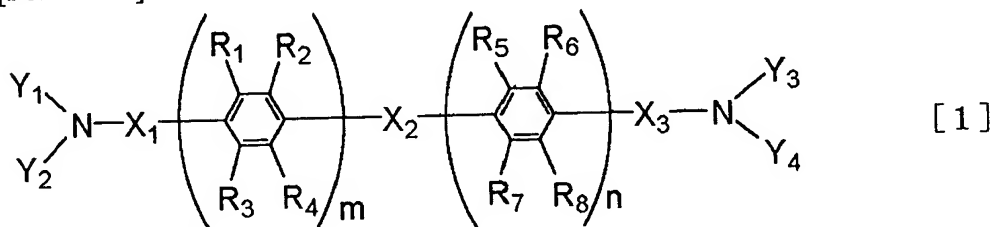
[4]

(Ar₈-Ar₁₂ are the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and even if the same, they may differ.) R₁₄ is the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation or], an aralkyl radical, an aryl group and a heterocycle radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[Claim 4]

The organic light emitting device further characterized by containing the compound of the layer containing said organic compound shown by at least one kind of following general formula [1], and the compound shown by at least one kind of following general formula [5] at least in the organic light emitting device which has at least a layer containing the organic compound of one layer or two or more layers ****(ed) by the electrode of a couple which consists of an anode plate and cathode, and inter-electrode [of this couple].

[Formula 7]



[1]

(X₁, X₂, and X₃ may be the radicals of the bivalence chosen from the group which consists of the alkylene group which is not permuted [direct coupling, a permutation or, an aralkylene group, an arylene radical, and a heterocycle radical, and they may be the alkylene group which has the connection radical which may differ even if the same, and consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, an aralkylene group, an alkenylene group, the amino group, a silyl radical, a carbonyl group a ether group, and a thioether radical.

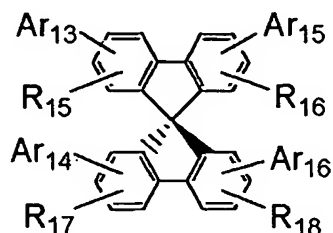
Y₁-Y₄ The alkyl group which is not permuted [a permutation or], an aralkyl radical, an aryl group, and a heterocycle radical, The alkylene group which is not permuted [the permutation which has the connection radical which consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, or], The carbonyl group which is not permuted [which has the connection radical which consists of an arylene radical which is not permuted / an aralkylene group, an alkenylene group, the amino group and a silyl radical, a permutation, or / or a heterocycle radical of bivalence], It is the radical chosen from the group which consists of a ether group and a thioether radical, and even if the same, you may differ.

Moreover, Y₁, and Y₂, Y₃ and Y₄ may be combined mutually, and the ring may be formed, and it may join together mutually and X₁, Y₁, and Y₂, X₃, Y₃ and Y₄ may form the ring.

R₁-R₈ are the radicals chosen from the group which consists of the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, and an aryl group, and even if the same, they may differ.

m+n is the integer of 0-10.

[Formula 8]



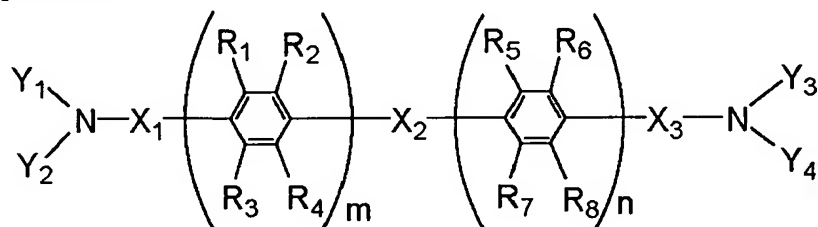
[5]

(Even if the same, you may differ, and Ar13-Ar16 may be the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and any three may be the aralkyl radical which is not permuted [the alkyl group which is not permuted / a hydrogen atom, a permutation, or /, a permutation or].) R15-R18 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, an aryl group and a heterocycle radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[Claim 5]

The organic light emitting device further characterized by containing the compound of the layer containing said organic compound shown by at least one kind of following general formula [1], and the compound shown by at least one kind of following general formula [6] at least in the organic light emitting device which has at least a layer containing the organic compound of one layer or two or more layers ****(ed) by the electrode of a couple which consists of an anode plate and cathode, and inter-electrode [of this couple].

[Formula 9]



[1]

(X1, X2, and X3 may be the radicals of the bivalence chosen from the group which consists of the alkylene group which is not permuted [direct coupling, a permutation or, an aralkylene group, an arylene radical, and a heterocycle radical, and they may be the alkylene group which has the connection radical which may differ even if the same, and consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, an aralkylene group, an alkenylene group, the amino group, a silyl radical, a carbonyl group a ether group, and a thioether radical.

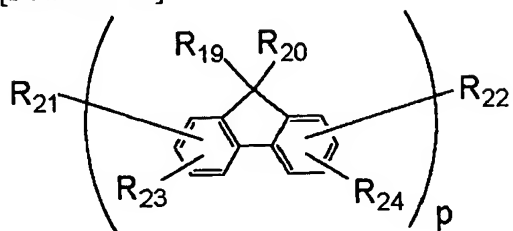
Y1-Y4 The alkyl group which is not permuted [a permutation or], an aralkyl radical, an aryl group, and a heterocycle radical, The alkylene group which is not permuted [the permutation which has the connection radical which consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, or], The carbonyl group which is not permuted [which has the connection radical which consists of an arylene radical which is not permuted / an aralkylene group, an alkenylene group, the amino group and a silyl radical, a permutation, or / or a heterocycle radical of bivalence], It is the radical chosen from the group which consists of a ether group and a thioether radical, and even if the same, you may differ.

Moreover, Y1, and Y2, Y3 and Y4 may be combined mutually, and the ring may be formed, and it may join together mutually and X1, Y1, and Y2, X3, Y3 and Y4 may form the ring.

R1-R8 are the radicals chosen from the group which consists of the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, and an aryl group, and even if the same, they may differ.

m+n is the integer of 0-10.

[Formula 10]



[6]

(Even if R19 and R20 which R19 and R20 are a hydrogen atom and the radical chosen from the group which becomes a list from the alkyl group which is not permuted [a permutation or], an aralkyl radical, and an aryl group, may differ from each other even if R19 comrades and R20 comrades which are combined with a different fluorene radical are the same, and are combined with the same fluorene radical are the same, they may differ.) R21-R24 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical and an alkoxy group, a permutation silyl radical, and the radical chosen from the group which becomes a list from a cyano group. p is the integer of 2-10.

[Claim 6]

The organic light emitting device according to claim 1 to 5 characterized by the layer containing the compound shown by said general formula [1] or general formula [2] - [6] being a luminous layer.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the component which emits light by impressing electric field to the thin film which consists of an organic compound in detail about an organic light emitting device.

[0002]

[Description of the Prior Art]

An organic light emitting device is a component using the light emitted in case the exciton of a fluorescence compound is made to generate and this exciton returns to a ground state by making the thin film containing a fluorescence organic compound pinch, and pouring in an electron and a hole (electron hole) from each electrode between an anode plate and cathode.

[0003]

In research (Appl.Phys.Lett.51,913 (1987)) of KODAKKU, ITO is used for an anode plate, the alloy of magnesium silver will be used for cathode in 1987, respectively, and about two 1000 cd/m luminescence is reported by the component of the functional discrete-type two-layer configuration which used the triphenylamine derivative for the hole transport ingredient in about [10V] applied voltage, using an aluminum quinolinol complex as an electronic transport ingredient and a luminescent material. As a patent of relation, U.S. Pat. No. 4, No. 539 or 507, a U.S. Pat. No. 4,720,432 number, a U.S. Pat. No. 4,885,211 number, etc. are mentioned.

[0004]

Moreover, by changing the class of fluorescence organic compound, luminescence from ultraviolet to infrared rays is possible, and, recently, research of various compounds is done actively. For example, it is indicated by a U.S. Pat. No. 5,151,629 number, a U.S. Pat. No. 5,409,783 number, a U.S. Pat. No. 5,382,477 number, JP,2-247278,A, JP,3-255190,A, JP,5-202356,A, JP,9-202878,A, JP,9-227576,A, etc.

[0005]

Furthermore, the organic light emitting device which used the conjugated-system giant molecule other than an organic light emitting device using the above low-molecular ingredients is reported by the group (Nature, 347,539 (1990)) of Cambridge University. By this report, luminescence is checked by the monolayer by forming polyphenylene vinylene (PPV) by the coating system. As a related patent of the organic light emitting device using a conjugated-system macromolecule, a U.S. Pat. No. 5,247,190 number, a U.S. Pat. No. 5,514,878 number, a U.S. Pat. No. 5,672,678 number, JP,4-145192,A, JP,5-247460,A, etc. are mentioned.

[0006]

Thus, the latest advance in an organic light emitting device is remarkable, and the description has suggested the possibility from the versatility of high brightness and luminescence wavelength, high-speed responsibility, a thin shape, and the lightweight formation of a luminescence device being possible to an extensive application with low applied voltage.

[0007]

However, there are still many problems in respect of endurance, such as degradation by an ambient atmosphere gas, moisture, etc. containing aging and oxygen by activity of long duration. When the application to a full color display etc.

is furthermore considered, the blue of the optical output of the further high brightness or high conversion efficiency, and high color purity, green, and red luminescence are required of the actual condition.

[0008]

For example, although the diamine compound is indicated by JP,2001-52868,A as a luminescent material, blue luminescence of high color purity (chromaticity coordinate: x, y= 0.14-0.15, 0.09-0.10) is not obtained. Moreover, as an example which used the compound which has the same diamino frame, although JP,11-312587,A is indicated, blue luminescence of high color purity is not obtained.

[0009]

[Problem(s) to be Solved by the Invention]

This invention is made in order to solve the trouble of such a conventional technique, it presents a luminescent color phase with very sufficient purity, and it is efficient and it aims at offering the organic light emitting device which has the optical output of high brightness and a high life. Furthermore, manufacture aims at offering the easy and organic light emitting device which can be created comparatively cheaply.

[0010]

[Means for Solving the Problem]

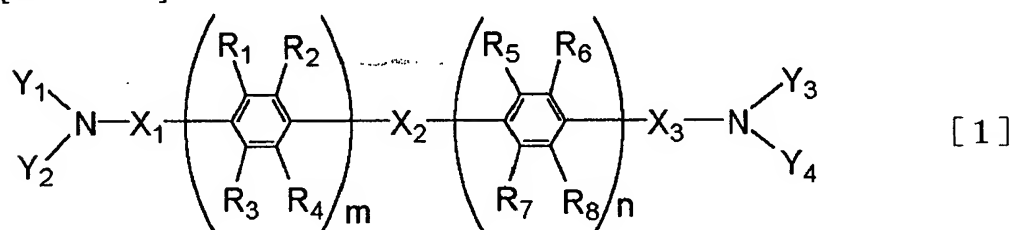
this invention person etc. came to complete this invention, as a result of inquiring wholeheartedly, in order to solve an above-mentioned technical problem.

[0011]

Namely, the organic light emitting device of this invention is set to the organic light emitting device which has at least a layer containing the organic compound of one layer or two or more layers ****(ed) by the electrode of a couple which consists of an anode plate and cathode, and inter-electrode [of this couple]. It is further characterized by containing the compound of the layer containing said organic compound shown by at least one kind of following general formula [1], and one of the compounds shown by at least 1 kind of following general formula [2] - [6] at least.

[0012]

[Formula 11]



[0013]

(X1, X2, and X3 may be the radicals of the bivalence chosen from the group which consists of the alkylene group which is not permuted [direct coupling, a permutation or, an aralkylene group, an arylene radical, and a heterocycle radical, and they may be the alkylene group which has the connection radical which may differ even if the same, and consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, an aralkylene group, an alkenylene group, the amino group, a silyl radical, a carbonyl group a ether group, and a thioether radical.

[0014]

Y1-Y4 The alkyl group which is not permuted [a permutation or], an aralkyl radical, an aryl group, and a heterocycle radical, The alkylene group which is not permuted [the permutation which has the connection radical which consists of an arylene radical which is not permuted / a permutation or / or a heterocycle radical of bivalence, or], The carbonyl group which is not permuted [which has the connection radical which consists of an arylene radical which is not permuted / an aralkylene group, an alkenylene group, the amino group and a silyl radical, a permutation, or / or a heterocycle radical of bivalence], It is the radical chosen from the group which consists of a ether group and a thioether radical, and even if the same, you may differ.

[0015]

Moreover, Y1, and Y2, Y3 and Y4 may be combined mutually, and the ring may be formed, and it may join together mutually and X1, Y1, and Y2, X3, Y3 and Y4 may form the ring.

[0016]

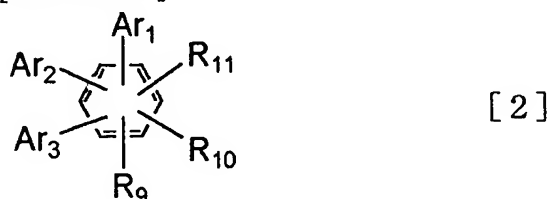
R1-R8 are the radicals chosen from the group which consists of the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, and an aryl group, and even if the same, they may differ.

[0017]

m+n is the integer of 0-10.

[0018]

[Formula 12]



[0019]

(Even if the same, you may differ, and Ar1-Ar3 may be the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and any one may be an aralkyl radical which is not permuted [the alkyl group which is not permuted / a hydrogen atom, a permutation, or /, a permutation or].) R9-R11 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or] and an aralkyl radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[0020]

[Formula 13]

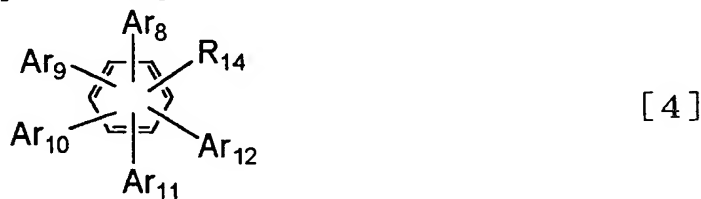


[0021]

(Ar4-Ar7 are the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and even if the same, they may differ.) R12 and R13 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or] and an aralkyl radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[0022]

[Formula 14]

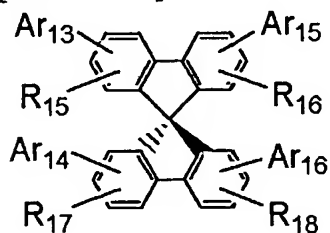


[0023]

(Ar8-Ar12 are the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and even if the same, they may differ.) R14 is the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation or], an aralkyl radical, an aryl group and a heterocycle radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[0024]

[Formula 15]



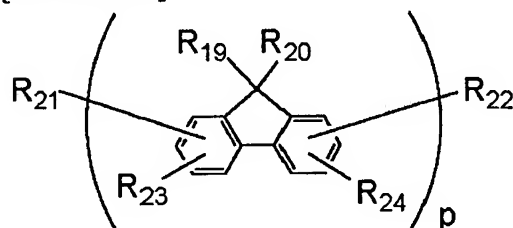
[5]

[0025]

(Even if the same, you may differ, and Ar13-Ar16 may be the radicals chosen from the group which consists of the aryl group and heterocycle radical which are not permuted [a permutation or], and any three may be the aralkyl radical which is not permuted [the alkyl group which is not permuted / a hydrogen atom, a permutation, or /, a permutation or].) R15-R18 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical, an aryl group and a heterocycle radical, a permutation amino group, and the radical chosen from the group which becomes a list from a cyano group.

[0026]

[Formula 16]



[6]

[0027]

(Even if R19 and R20 which R19 and R20 are a hydrogen atom and the radical chosen from the group which becomes a list from the alkyl group which is not permuted [a permutation or], an aralkyl radical, and an aryl group, may differ from each other even if R19 comrades and R20 comrades which are combined with a different fluorene radical are the same, and are combined with the same fluorene radical are the same, they may differ.) R21-R24 are the alkyl group which is not permuted [a hydrogen atom, a halogen radical, a permutation, or], an aralkyl radical and an alkoxy group, a permutation silyl radical, and the radical chosen from the group which becomes a list from a cyano group. p is the integer of 2-10.

[0028]

As for the organic light emitting device of this invention, it is desirable that the layer containing the compound shown by said general formula [1] or general formula [2] - [6] is a luminous layer.

[0029]

[Embodiment of the Invention]

Hereafter, this invention is explained to a detail.

[0030]

First, the compound shown by above-mentioned general formula [of this invention] [1] - [6] is explained.

[0031]

The compound shown by general formula [1] - [6] in this invention can mainly be used as a charge of organic light emitting device lumbar. In a compound [1], an emission spectrum with more narrow half-value width, i.e., luminescence which was more excellent in color purity, is obtained by introducing comparatively upright structures, such as p-phenylene frame, into a molecule principal chain. furthermore, the thing suppressed for a Stokes shift -- migration of luminescence wavelength -- stopping -- absorption -- a long wave -- a merit side -- **** -- the case where coming is also possible and it uses as a dopant ingredient -- relative -- a long wave -- the activity of the host ingredient which has an emission spectrum in a merit side also becomes possible. General formula [1] The compound shown by - [6] is set to a luminous layer, respectively. Dopant ingredient, It can be used for the object of both host ingredient, and high color purity, high luminous efficiency, and a high life component can be obtained. Use the compound shown by the general formula [1] especially as a dopant ingredient, and it and energy transfer with a combination with the compound shown by the lifting or cone general formula [which is a suitable host ingredient] [2] - [6] high -- color purity luminescence can be held and a component with more high effectiveness can be obtained. the dopant concentration to a host ingredient -- desirable -- 0.01wt(s)% - 50wt% -- it is 0.5wt(s)% - 10wt% more preferably.

[0032]

The above-mentioned general formula [1] The example of the substituent in - [6] is shown below.

[0033]

As the shape of a chain and the annular alkyl group which are not permuted [a permutation or], although a methyl group, an ethyl group, n-propyl group, n-butyl, n-hexyl group, n-decyl group, an iso-propyl group, iso-butyl, tert-butyl, a tert-octyl radical, a trifluoromethyl radical, a cyclohexyl radical, a cyclohexyl methyl group, etc. are mentioned, of course, it is not limited to these.

[0034]

As an aralkyl radical which is not permuted [a permutation or], although benzyl, a phenethyl radical, etc. are mentioned, of course, it is not limited to these.

[0035]

As an aryl group which is not permuted [a permutation or], although a phenyl group, 4-methylphenyl radical, 4-methoxyphenyl radical, 4-ethyl phenyl group, 4-fluoro phenyl group, 3, 5-dimethylphenyl radical, the triphenyl amino group, a biphenyl radical, a terphenyl radical, a naphthyl group, an anthracenyl group, a phenan SURERIRU radical, a pyrenyl radical, a tetra-SENIRU radical, a pen TASENIRU radical, a fluorenyl group, a TORIFE elm nil radical, a peri RENIRU radical, etc. are mentioned, of course, it be limited to these.

[0036]

As a heterocycle radical which is not permuted [a permutation or], although a pyrrolyl radical, a pyridyl radical, a bipyridyl radical, a methyl pyridyl radical, a TAPIRORIRU radical, a thienyl group, a TACHI enyl radical, a propyl thienyl group, a furil radical, a quinolyl radical, a carbazolyl radical, an oxazolyl radical, an oxadiazolyl radical, a thiazolyl radical, a thiadiazolyl radical, etc. are mentioned, of course, it is not limited to these.

[0037]

As an alkylene group which is not permuted [a permutation or], although a methylene group, ethylene, a propylene radical, an iso-propylene radical, a butylene radical, a tert-butylene radical, a hexylene radical, a heptylene radical, a cyclo hexylene radical, a cyclohexyl methylene group, etc. are mentioned, of course, it is not limited to these.

[0038]

As an aralkylene group which is not permuted [a permutation or], although benzylene group, a phenylethylene radical, a phenethylene radical, etc. are mentioned, of course, it is not limited to these.

[0039]

As an arylene radical which is not permuted [a permutation or], although a phenylene group, a biphenylene radical, 2, 3 and 5, 6-tetrafluoro phenylene group, 2, 5-dimethyl phenylene group, a naphthylene radical, an anthracenylene group, a phenan SURENIREN radical, a tetra-SENIREN radical, a pen TASENIREN radical, a peri RENIREN radical, etc. are mentioned, of course, it is not limited to these.

[0040]

As a heterocycle radical of the bivalence which is not permuted [a permutation or], although a hula NIREN radical, a PIORIREN radical, a pilus JINIREN radical, a TAPIRIJINIREN radical, a thio phenylene group, a TACHIO phenylene group, an OKISAZORIREN radical, a thia ZORIREN radical, cull BAZORIREN, etc. are mentioned, of

course, it is not limited to these.

[0041]

As an alkenyl radical which is not permuted [a permutation or], although a vinyl group, an allyl group (2-propenyl radical), 1-propenyl radical, an iso-propenyl radical, 2-butenyl group, etc. are mentioned, of course, it is not limited to these.

[0042]

As an amino group which is not permuted [a permutation or], although the amino group, a methylamino radical, an ethylamino radical, a dimethylamino radical, a diethylamino radical, a methylethylamino radical, a benzylamino radical, the methylbenzyl amino group, a dibenzylamino radical, an ANIRINO radical, a diphenylamino radical, a phenyl tolylamino radical, a ditolylamino radical, the JIANISORIRU amino group, etc. are mentioned, of course, it is not limited to these.

[0043]

As a carbonyl group which is not permuted [a permutation or], although an acetyl group, a propionyl radical, an isobutyryl radical, a methacryloyl radical, benzoyl, a naphthoyl radical, an ANTORAIRU radical, a toluoyl radical, etc. are mentioned, of course, it is not limited to these.

[0044]

As an alkoxy group which is not permuted [a permutation or], although a methoxy group, an ethoxy radical, a propoxy group, a 2-ethyl-octyloxy radical, a phenoxy group, 4-butyl phenoxy group, a benzyloxy radical, etc. are mentioned, of course, it is not limited to these.

[0045]

As a sulfide radical which is not permuted [a permutation or], although a methyl sulfide radical, an ethyl sulfide radical, a phenyl sulfide radical, 4-methylphenyl sulfide radical, etc. are mentioned, of course, it is not limited to these.

[0046]

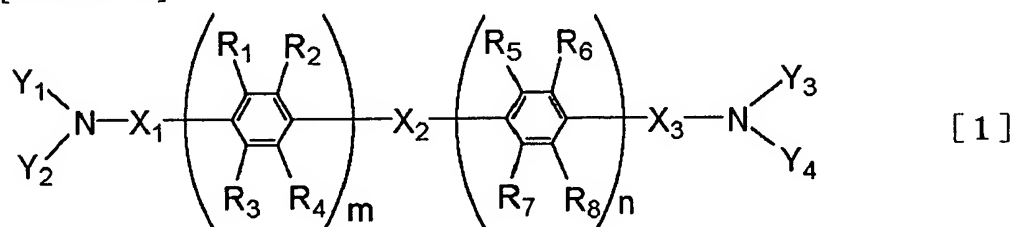
As a substituent which the above-mentioned substituent may have, a methyl group, an ethyl group, n-propyl group, An iso-propyl group, ter-butyl, an octyl radical, benzyl, Alkyl groups, such as a phenethyl radical, an aralkyl radical, a methoxy group, an ethoxy radical, A propoxy group, a 2-ethyl-octyloxy radical, a phenoxy group, 4-butyl phenoxy group, Alkoxy groups, such as a benzyloxy radical, a phenyl group, 4-methylphenyl radical, 4-ethyl phenyl group, a 3-chlorophenyl radical, 3, 5-dimethylphenyl radical, The triphenyl amino group, a biphenyl radical, a terphenyl radical, a naphthyl group, Aryl groups, such as an anthryl radical, a phenan thrill radical, and a pyrenyl radical, a pyridyl radical, Although heterocycle radicals, such as a bipyridyl radical, a methyl pyridyl radical, a thienyl group, a TACHI enyl radical, a propyl thienyl group, a furil radical, a quinolyl radical, a carbazolyl radical, and N-ethyl carbazolyl radical, a halogen radical, a cyano group, and a nitro group are mentioned Of course, it is not limited to these.

[0047]

Next, the example of representation is given about the compound shown by general formula [1] - [6]. However, it is not limited to these compounds.

[0048]

[Formula 17]























































[0049]

[A table 1]


[1]	m,n	R1 — R4	R5 — R8	X1	X2	X3	Y1	Y2	Y3	Y4
1	0,0	—	—	単結合		単結合	Ph	Ph	Ph	Ph
2	0,0	—	—	単結合		単結合				
3	0,0	—	—	単結合		単結合	Ph		Ph	
4	0,0	—	—	単結合		単結合	Ph		Ph	
5	0,0	—	—	単結合		単結合	Ph		Ph	
6	0,0	—	—	単結合		単結合	Ph		Ph	
7	0,0	—	—	単結合		単結合				
8	0,0	—	—	単結合		単結合	Ph		Ph	
9	0,0	—	—	単結合		単結合				
10	0,0	—	—	単結合		単結合	Ph		Ph	
11	0,0	—	—	単結合		単結合				
12	0,0	—	—	単結合		単結合	Ph		Ph	
13	0,0	—	—	単結合		単結合				
14	0,0	—	—	単結合		単結合	Ph		Ph	
15	0,0	—	—	単結合		単結合				
16	0,0	—	—	単結合		単結合				
17	0,0	—	—			単結合				

[0050]
[A table 2]

[1]	m,n	R1 — R4	R5 — R8	X1	X2	X3	Y1	Y2	Y3	Y4
18	0,0	—	—							
19	2,0	H	—	単結合	単結合	単結合				
20	2,0	H	—	単結合	単結合	単結合				
21	2,0	H	—	単結合	単結合	単結合	Ph		Ph	
22	2,0	H	—	単結合	単結合	単結合	Ph		Ph	
23	2,0	H	—	単結合	単結合	単結合	Ph		Ph	
24	2,0	H	—	単結合	単結合	単結合	Ph		Ph	
25	2,0	F	—	単結合	単結合	単結合				
26	2,0	F	—	単結合	単結合	単結合	Ph		Ph	
27	3,0	H	—	単結合	単結合	単結合				
28	3,0	H	—	単結合	単結合	単結合	Ph		Ph	
29	3,0	H	—	単結合	単結合	単結合	Ph		Ph	
30	3,0	H	—	単結合	単結合	単結合	Ph		Ph	
31	3,0	H	—	単結合	単結合	単結合	Ph		Ph	
32	3,0	F	—	単結合	単結合	単結合				
33	3,0	F	—	単結合	単結合	単結合	Ph		Ph	
34	4,0	H	—	単結合	単結合	単結合				
35	4,0	H	—	単結合	単結合	単結合				
36	4,0	H	—	単結合	単結合	単結合	Ph		Ph	

[0051]

[A table 3]

[1]	m,n	R1 — R4	R5 — R8	X1	X2	X3	Y1	Y2	Y3	Y4
37	4,0	H	—	単結合	単結合	単結合	Ph		Ph	
38	4,0	H	—	単結合	単結合	単結合	Ph		Ph	
39	4,0	H	—	単結合	単結合	単結合	Ph		Ph	
40	4,0	H	—	単結合	単結合	単結合				
41	4,0	H	—	単結合	単結合	単結合	Ph		Ph	
42	4,0	H	—	単結合	単結合	単結合	Ph		Ph	
43	4,0	H	—	単結合	単結合	単結合	Ph		Ph	
44	4,0	F	—	単結合	単結合	単結合				
45	4,0	F	—	単結合	単結合	単結合	Ph		Ph	
46	5,0	H	—	単結合	単結合	単結合				
47	5,0	H	—	単結合	単結合	単結合	Ph		Ph	
48	5,0	H	—	単結合	単結合	単結合	Ph		Ph	
49	5	H	—	単結合	単結合	単結合	Ph		Ph	
50	5	H	—	単結合	単結合	単結合	Ph		Ph	
51	5,0	H	—	単結合	単結合	単結合				
52	5,0	H	—	単結合	単結合	単結合	Ph		Ph	
53	1,1	H	F	単結合	単結合	単結合				
54	2,1	H	F	単結合	単結合	単結合				
55	2,2	H	F	単結合	単結合	単結合				
56	1,1	H	H	単結合		単結合				

[0052]
[A table 4]

[1]	m,n	R1 — R4	R5 — R8	X1	X2	X3	Y1	Y2	Y3	Y4
57	1,1	H	H	単結合		単結合				
58	1,1	H	H	単結合		単結合	Ph		Ph	
59	1,1	H	H	単結合		単結合				
60	1,1	H	H	単結合		単結合				
61	1,1	H	H	単結合		単結合				
62	1,1	H	H	単結合		単結合				
63	1,1	H	H	単結合		単結合				
64	1,1	H	H	単結合		単結合				
65	1,1	H	H	単結合		単結合	Ph		Ph	
66	1,1	H	H	単結合		単結合	Ph		Ph	
67	1,1	H	H	単結合		単結合	Ph		Ph	
68	1,1	H	H	単結合		単結合				
69	1,1	H	H	単結合		単結合				
70	1,1	H	H	単結合		単結合				
71	1,1	H	H	単結合		単結合				
72	1,1	H	H	単結合		単結合				

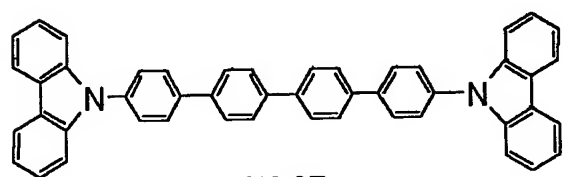
[0053]

[A table 5]

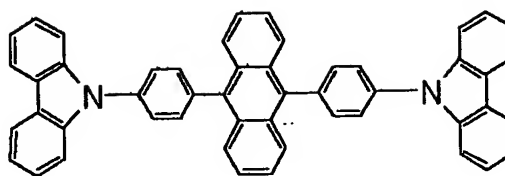
[1]	m,n	R1 — R4	R5 — R8	X1	X2	X3	Y1	Y2	Y3	Y4
73	1,1	H	H	単結合		単結合				
74	1,1	H	H	単結合		単結合				
75	2,2	H	H	単結合		単結合				
76	2,2	H	H	単結合		単結合				
77	2,2	H	H	単結合		単結合				
78	2,2	H	H	単結合		単結合				
79	1,1	H	F	単結合		単結合				
80	1,1	H	F	単結合		単結合				
81	1,1	H	F	単結合		単結合				
82	1,1	H	F		単結合					
83	2,1	H	F		単結合					
84	2,2	H	F		単結合					
85	1,1	H	H							
86	2,2	H	H							

[0054]

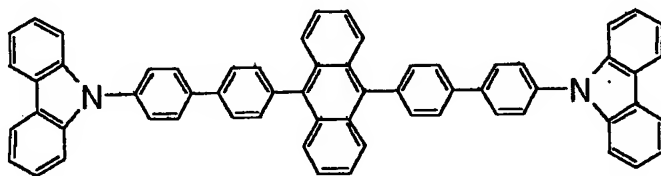
[Formula 18]



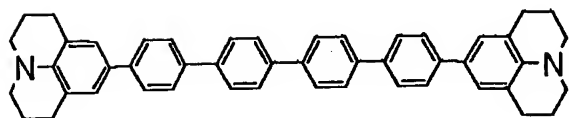
[1]-87



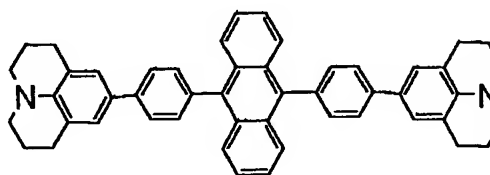
[1]-88



[1]-89

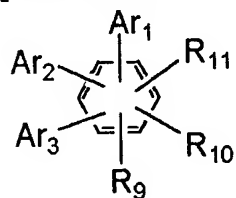


[1]-90



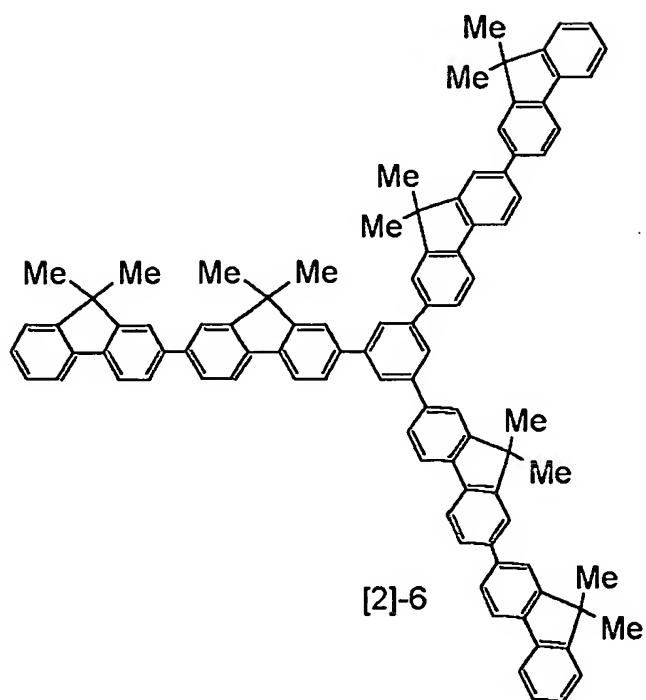
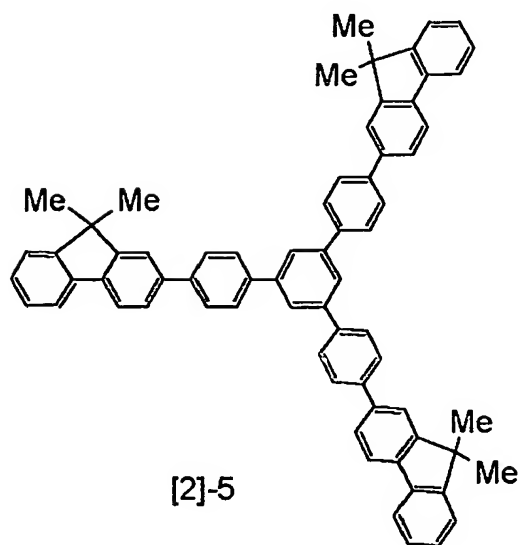
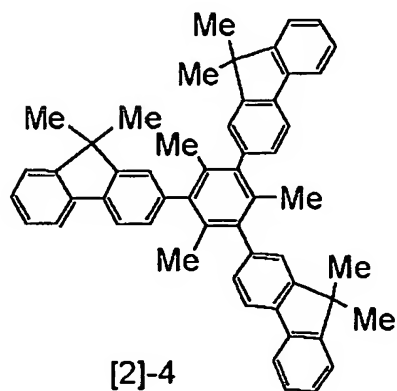
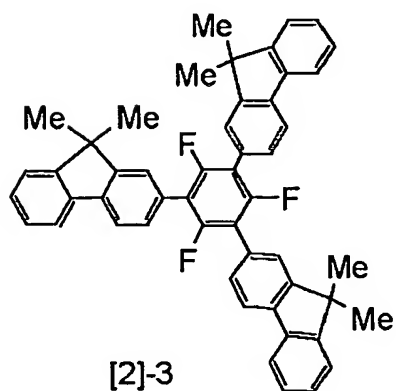
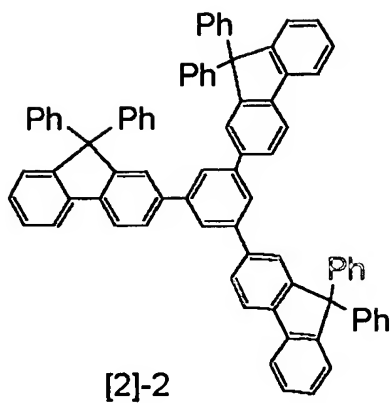
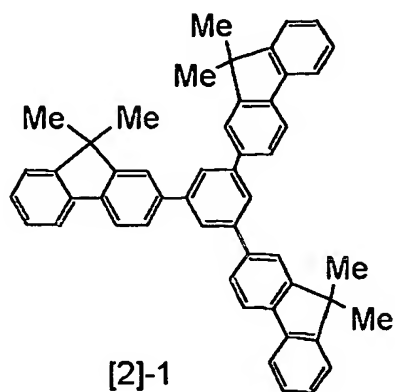
[1]-91

[0055]
[Formula 19]

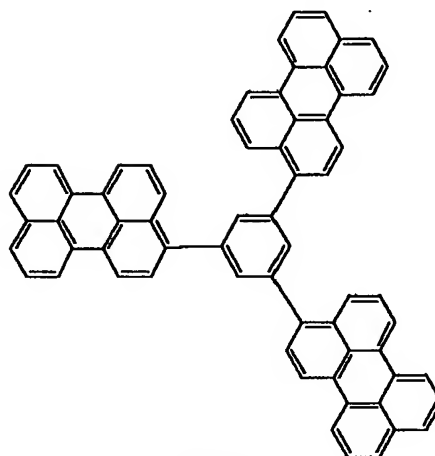
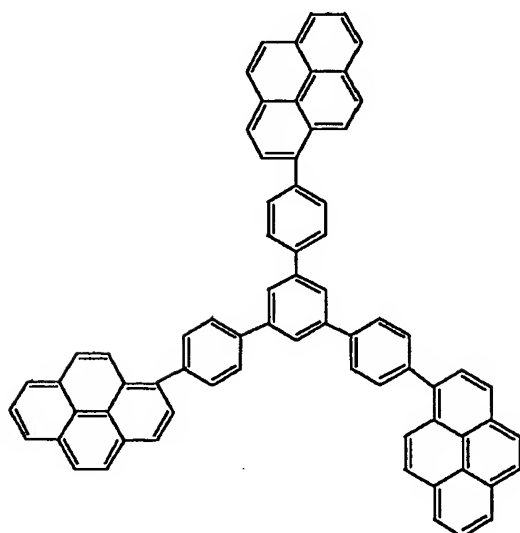
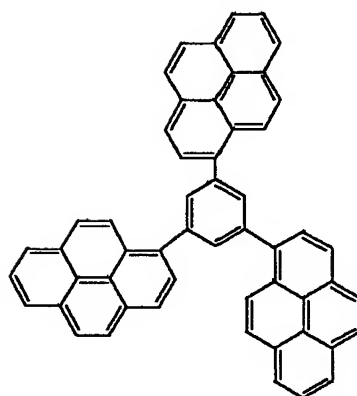
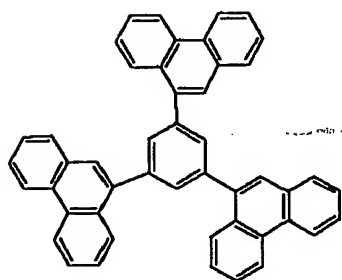
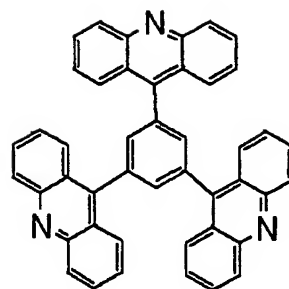
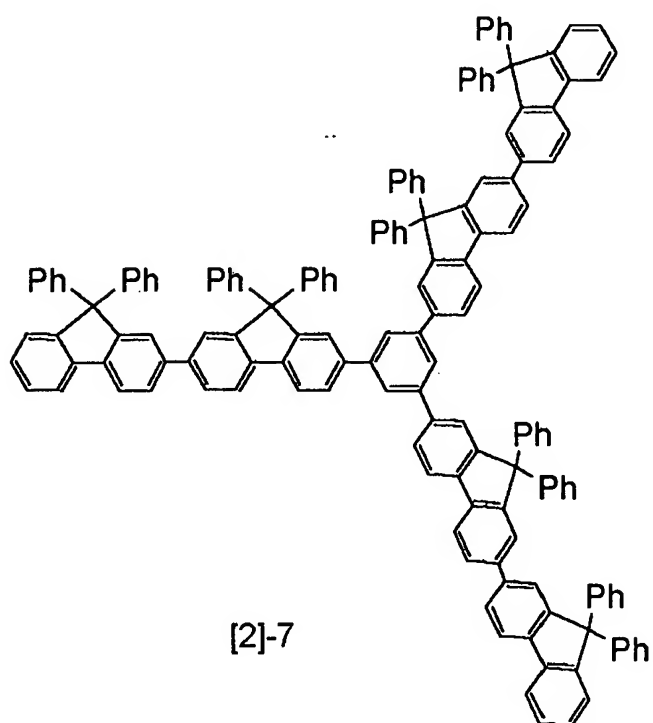


[2]

[0056]
[Formula 20]

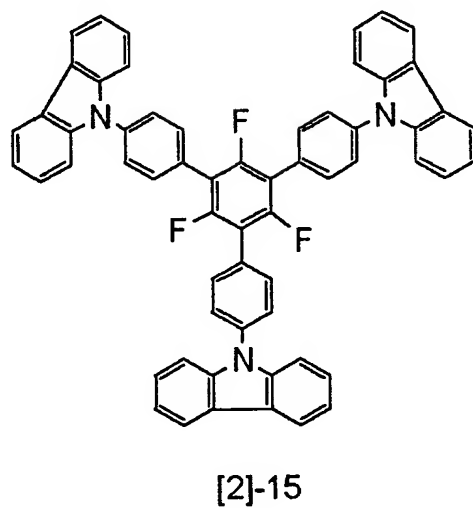
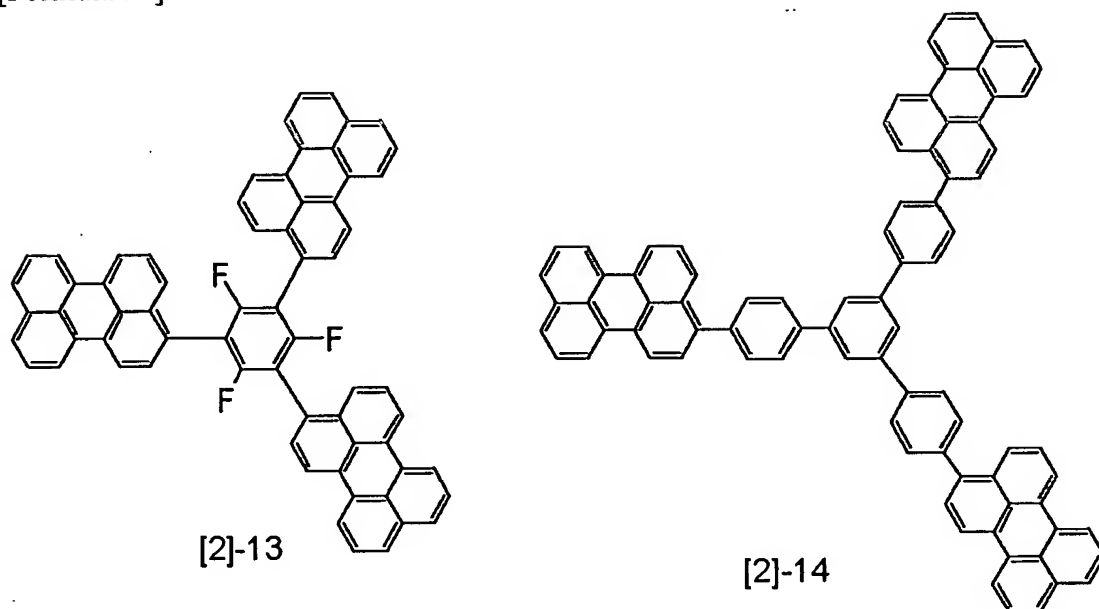


[0057]
[Formula 21]



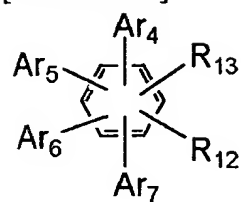
[0058]

[Formula 22]



[0059]

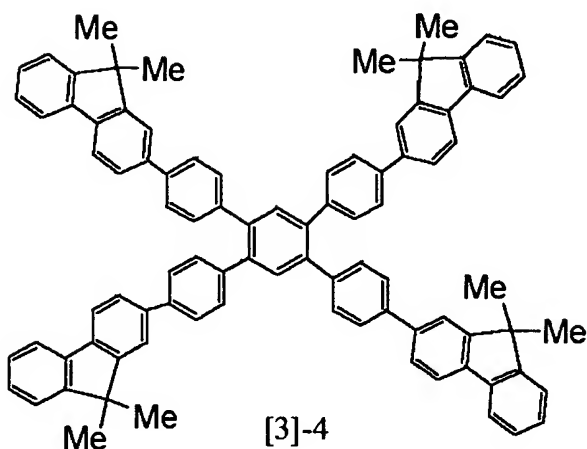
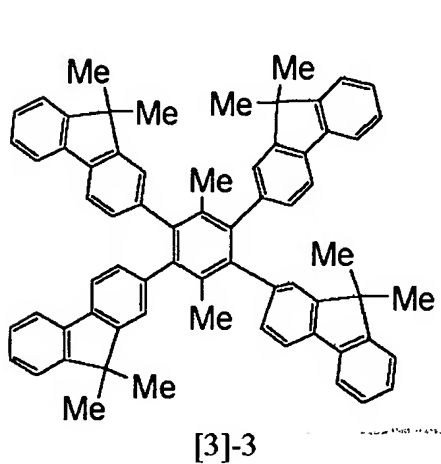
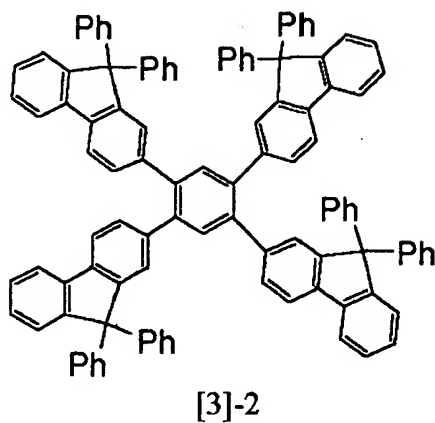
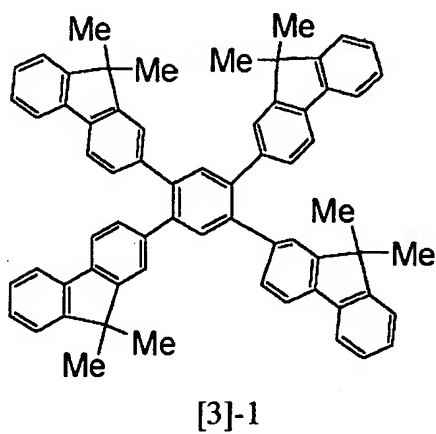
[Formula 23]



[3]

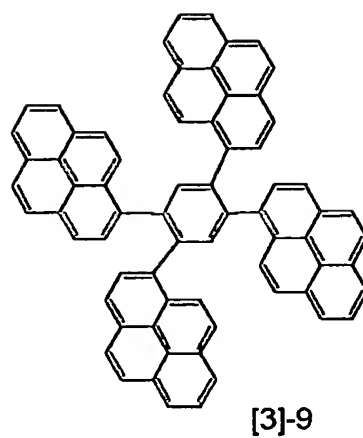
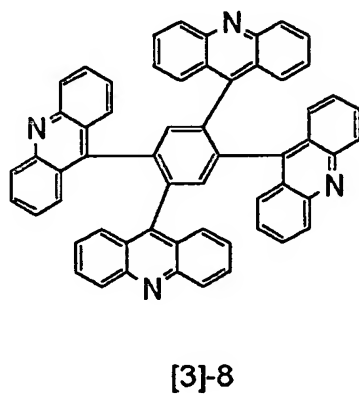
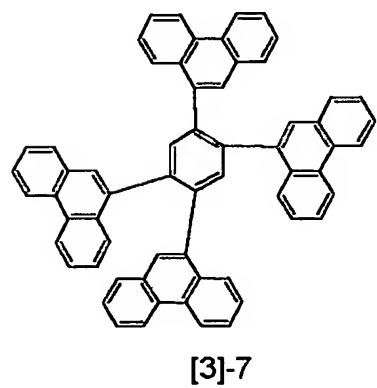
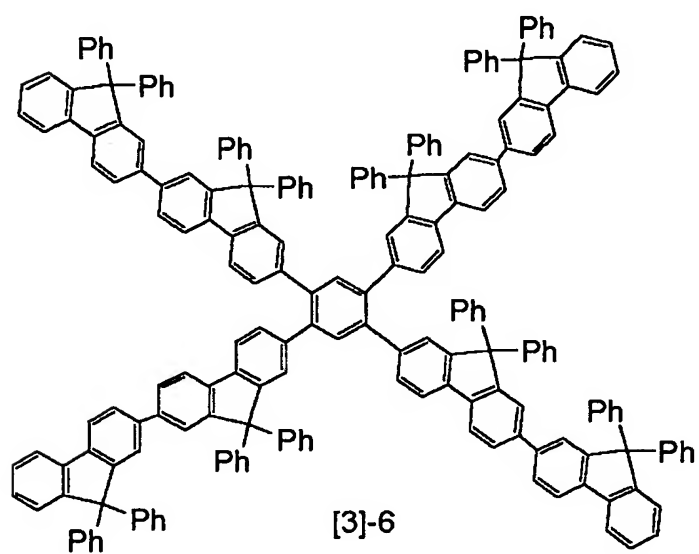
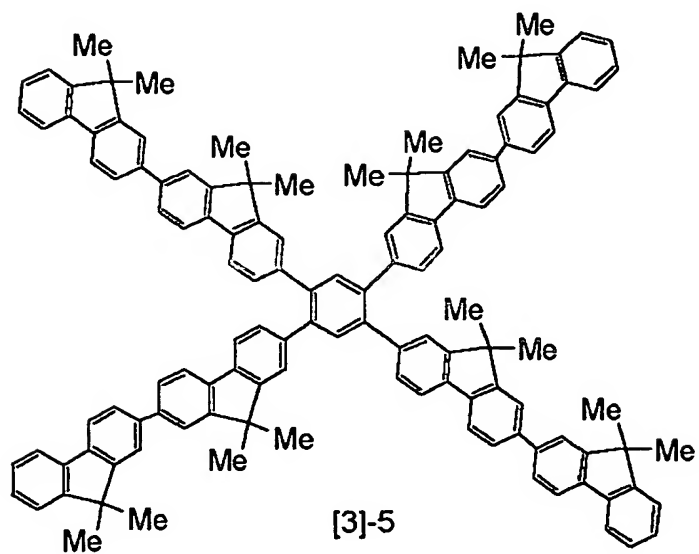
[0060]

[Formula 24]

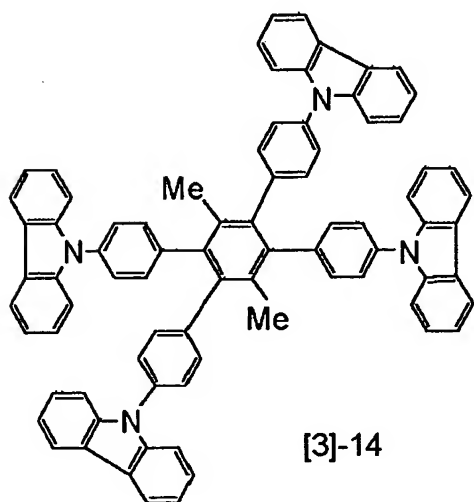
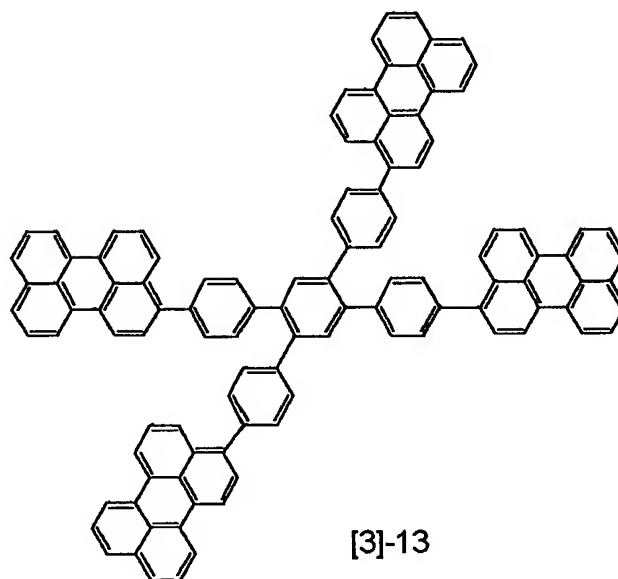
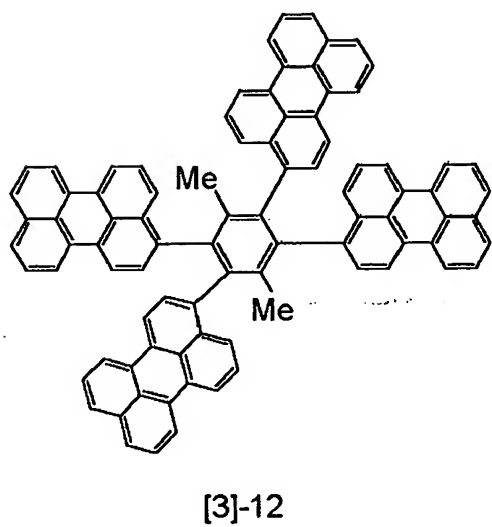
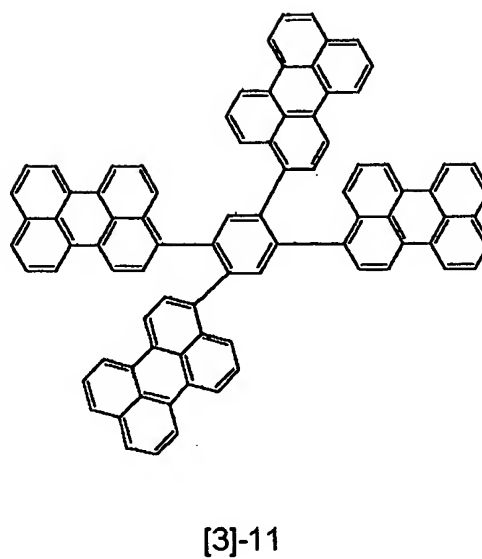
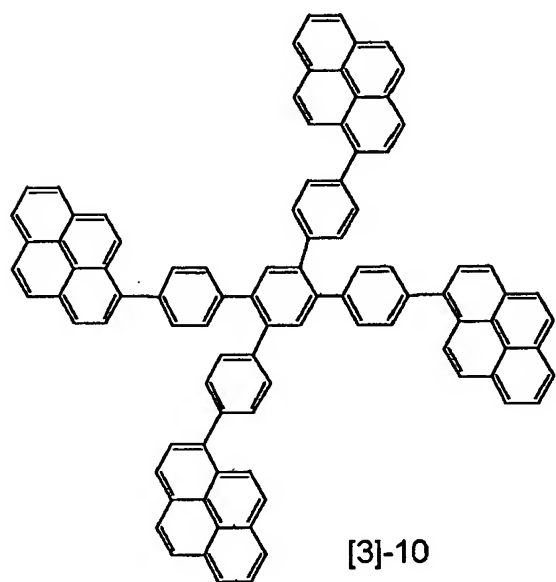


[0061]

[Formula 25]

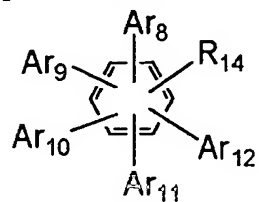


[0062]
[Formula 26]



[0063]

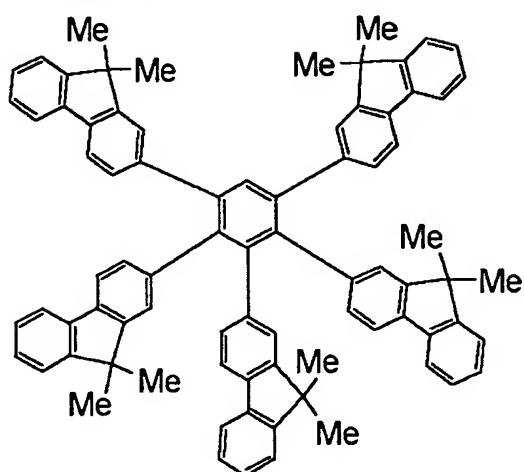
[Formula 27]



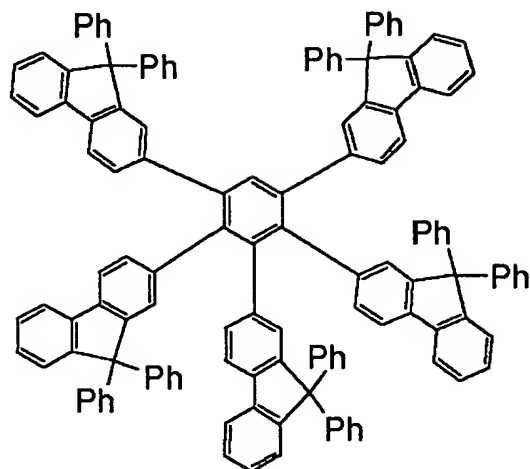
[4]

[0064]

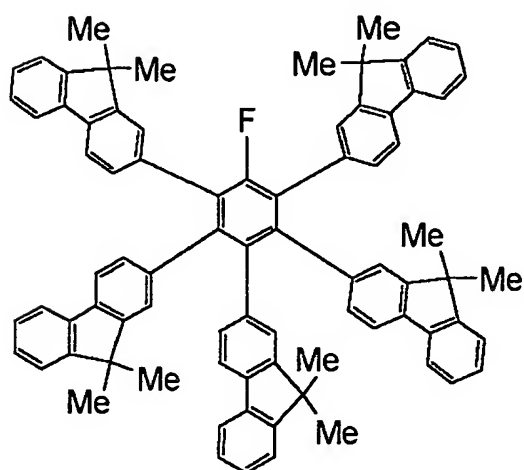
[Formula 28]



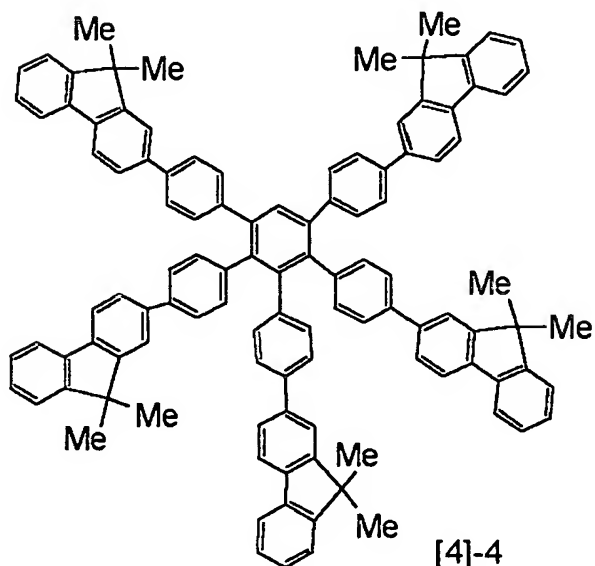
[4]-1



[4]-2



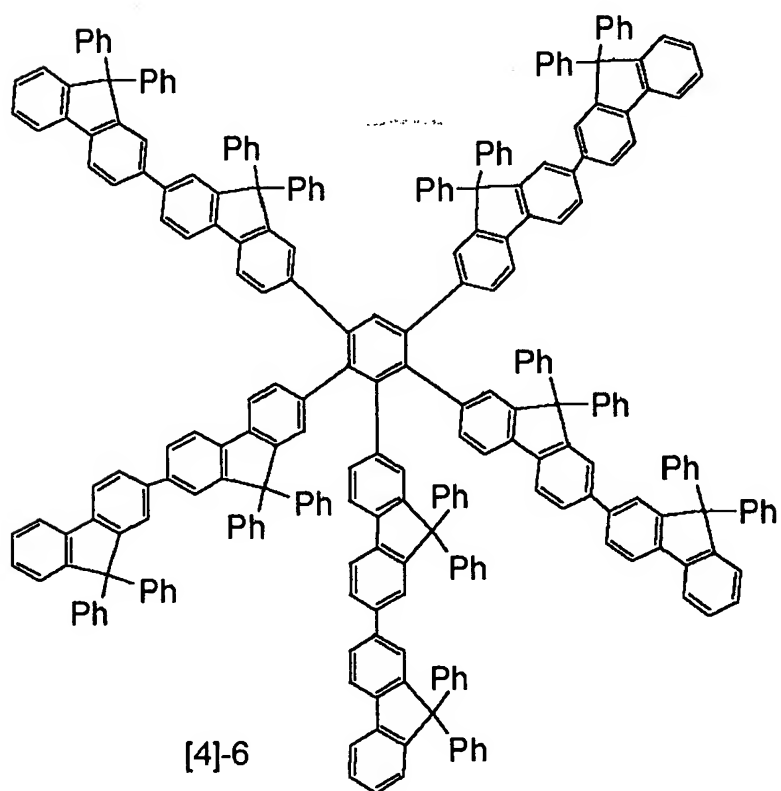
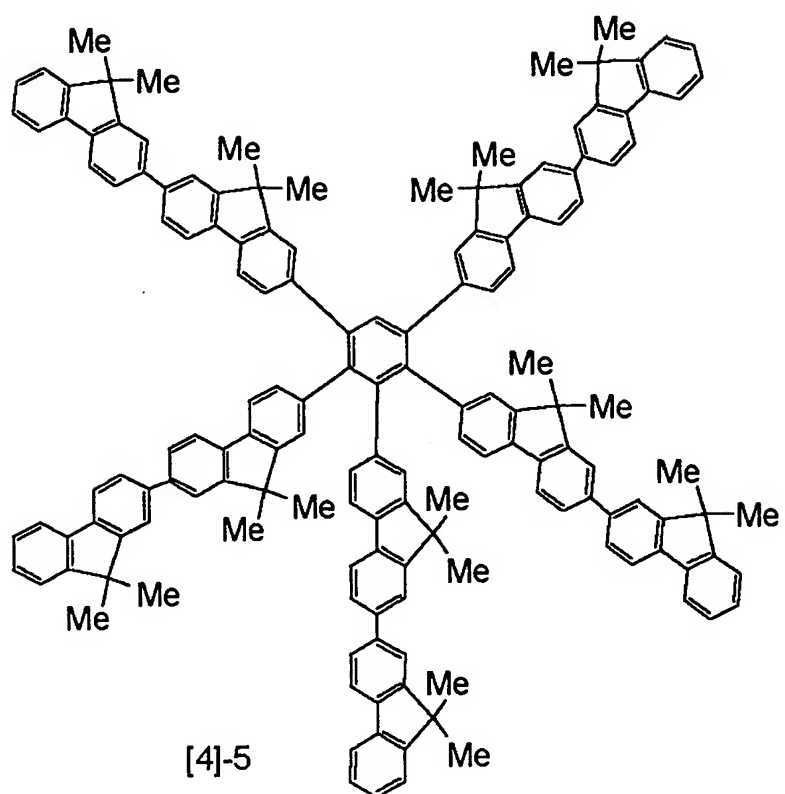
[4]-3



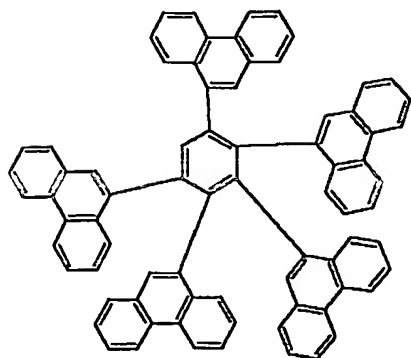
[4]-4

[0065]

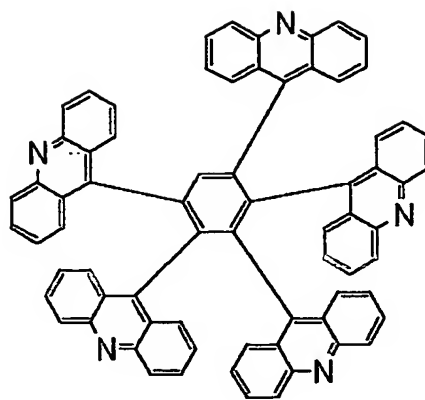
[Formula 29]



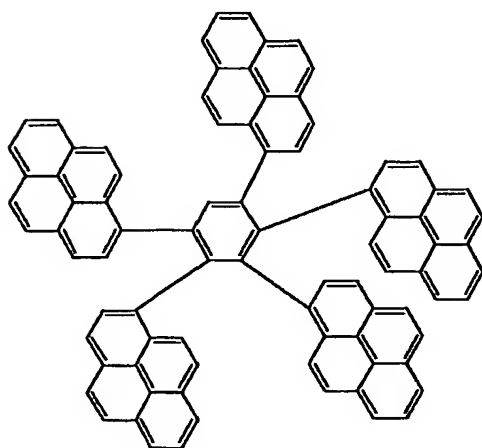
[0066]
[Formula 30]



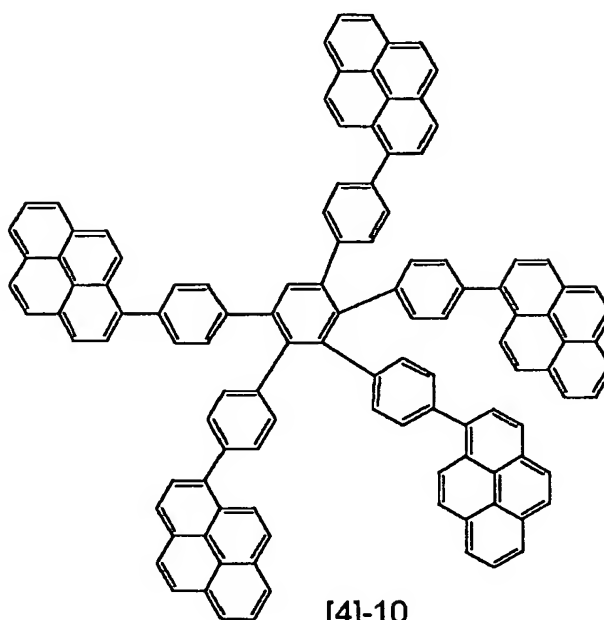
[4]-7



[4]-8

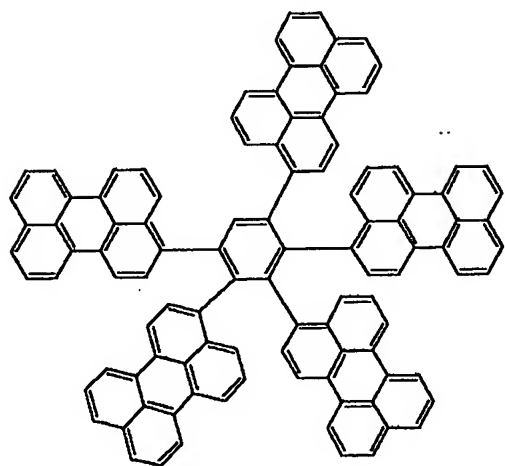


[4]-9

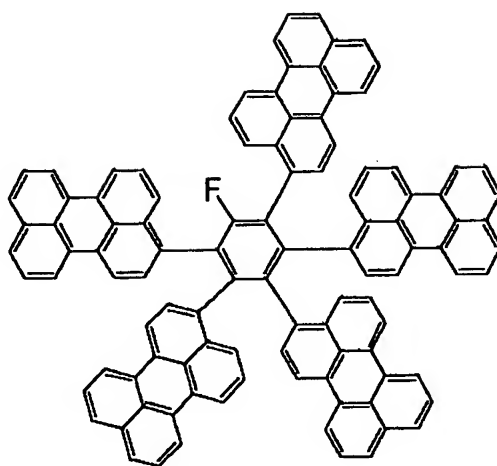


[4]-10

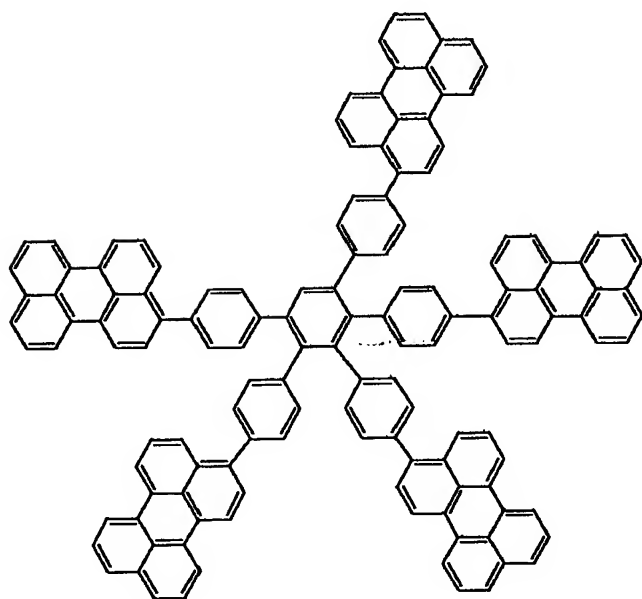
[0067]
[Formula 31]



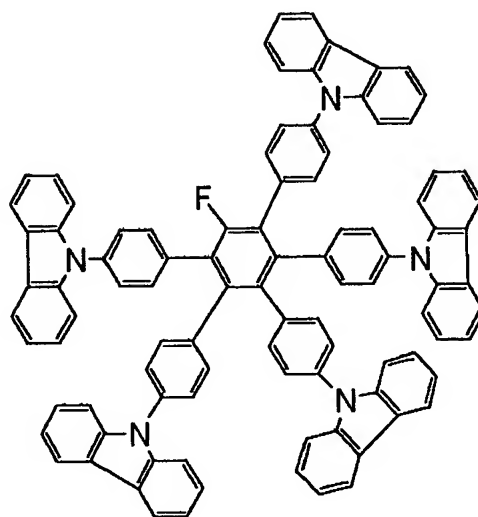
[4]-11



[4]-12

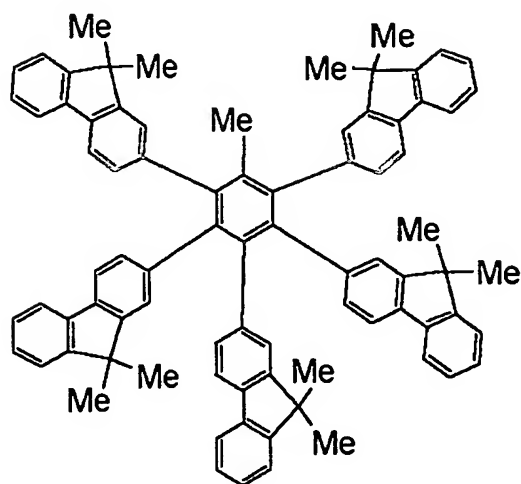


[4]-13

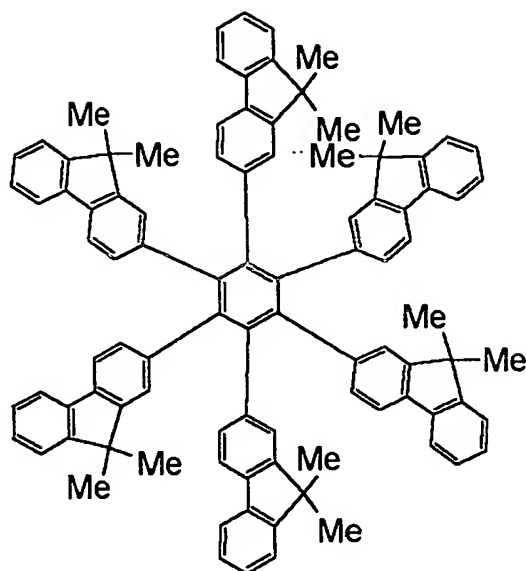


[4]-14

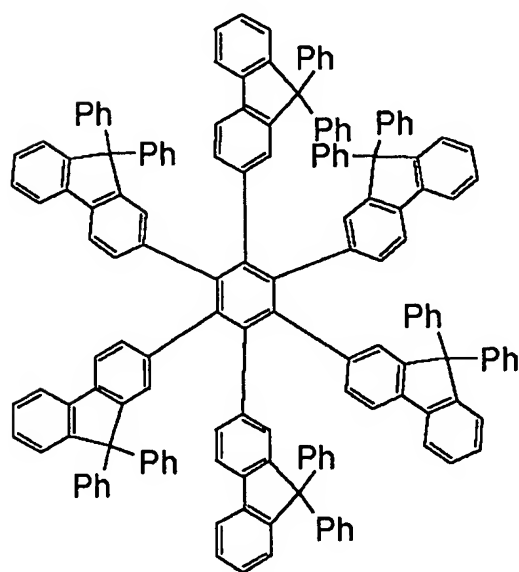
[0068]
[Formula 32]



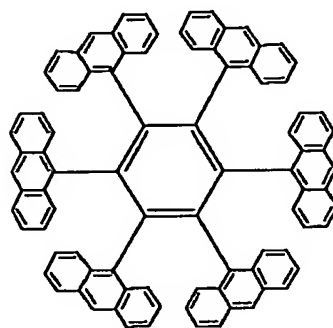
[4]-15



[4]-16

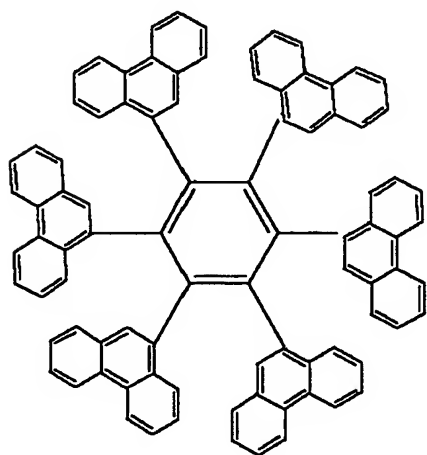


[4]-17

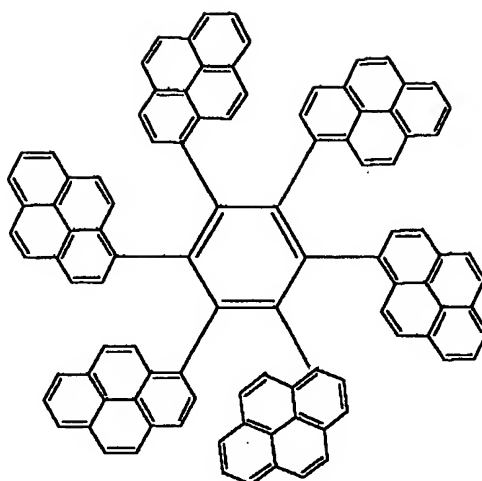


[4]-18

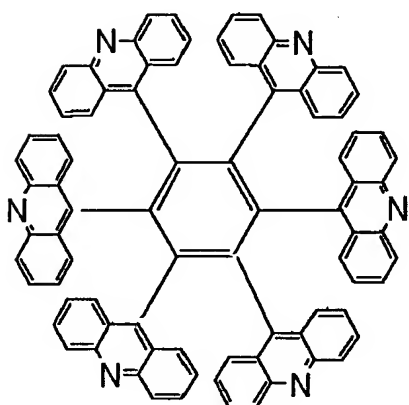
[0069]
[Formula 33]



[4]-19

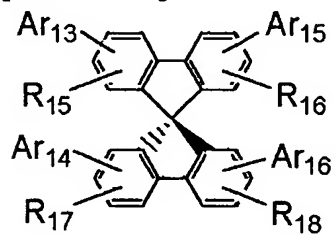


[4]-20



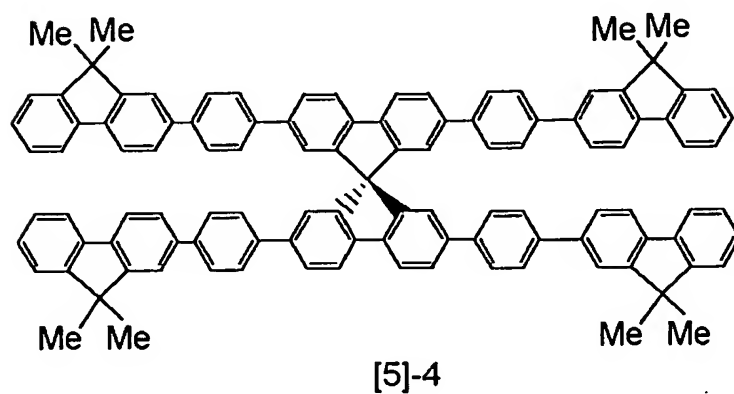
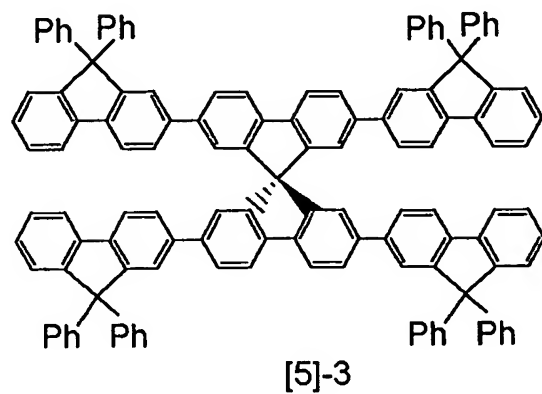
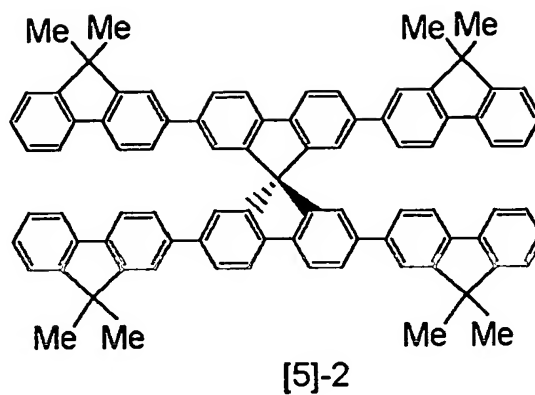
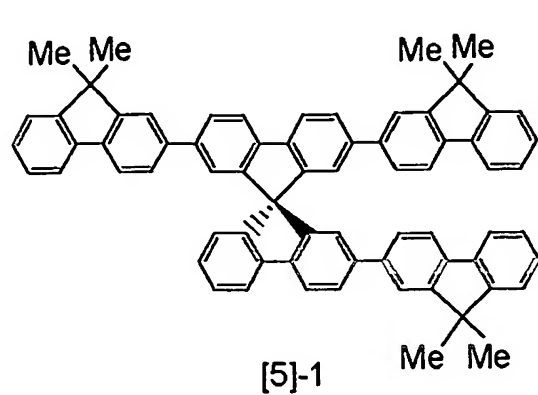
[4]-21

[0070]
[Formula 34]

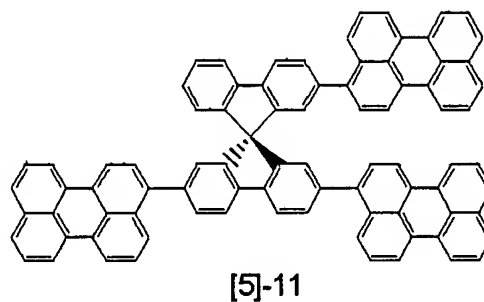
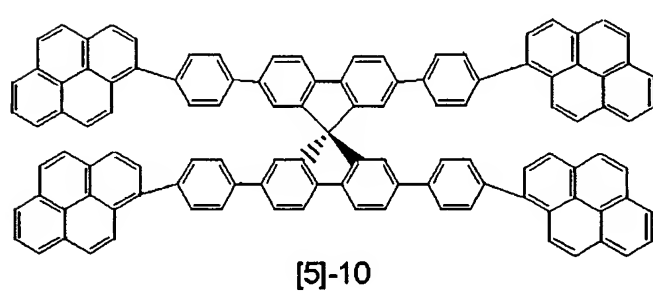
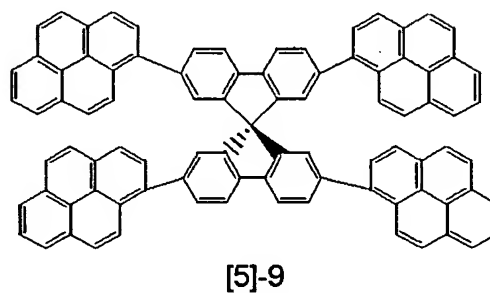
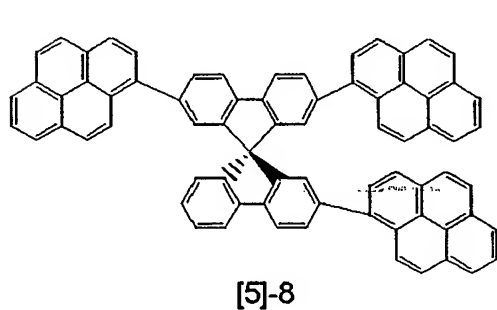
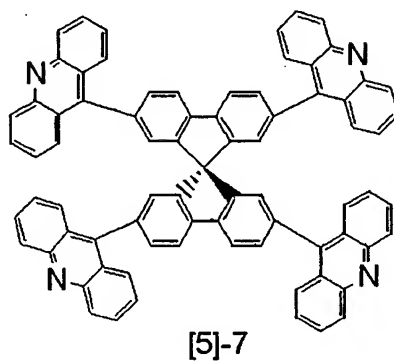
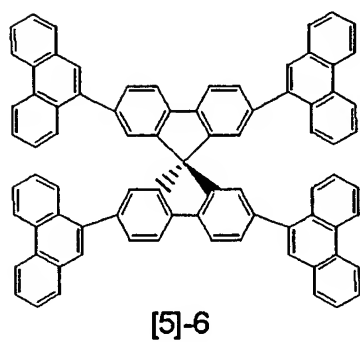
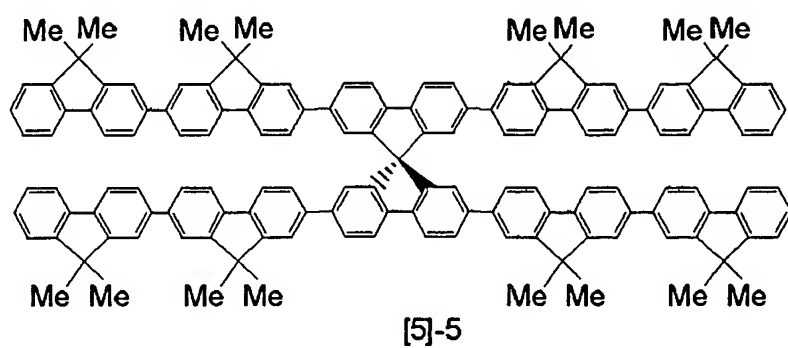


[5]

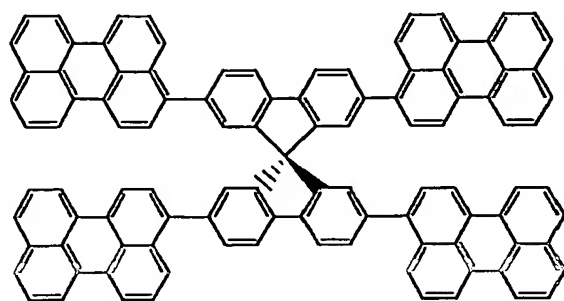
[0071]
[Formula 35]



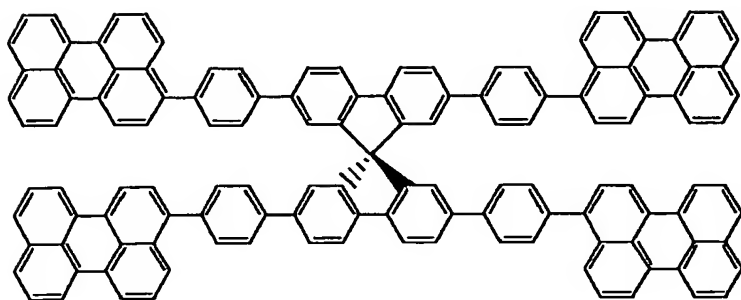
[0072]
[Formula 36]



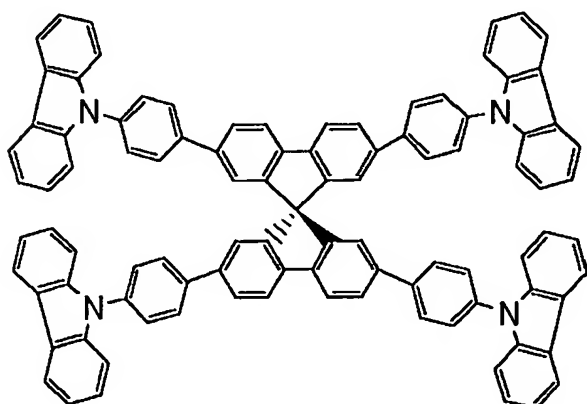
[0073]
[Formula 37]



[5]-12

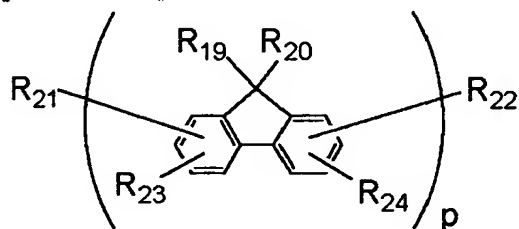


[5]-13



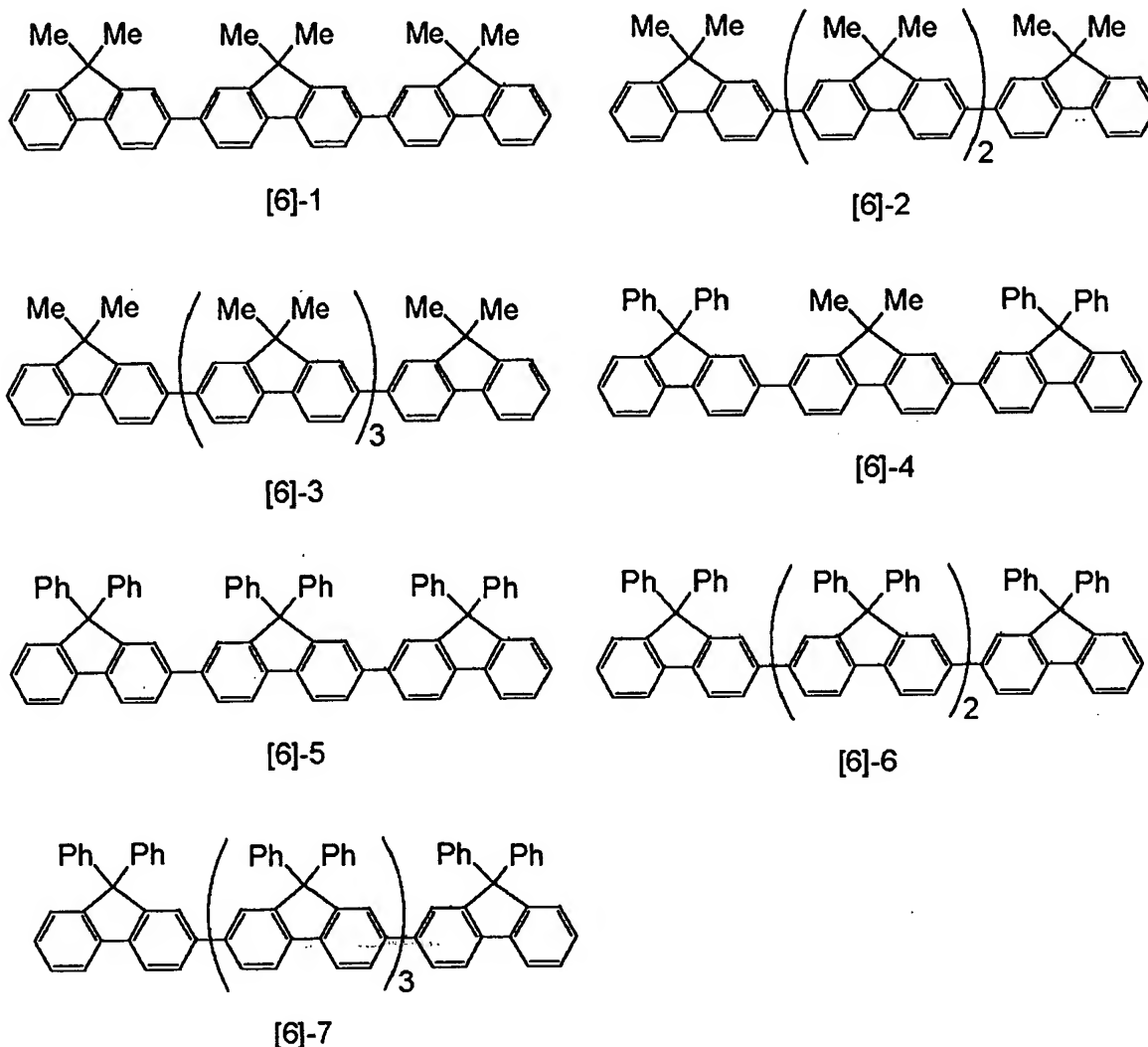
[5]-14

[0074]
[Formula 38]



[6]

[0075]
[Formula 39]



[0076]

An example with the organic desirable light emitting device of this invention is shown in drawing 1 - drawing 6.

[0077]

Drawing 1 is the sectional view showing an example of the organic light emitting device of this invention. Drawing 1 is the thing of a configuration of having formed an anode plate 2, a luminous layer 3, and cathode 4 one by one on the substrate 1. The light emitting device used here is useful, when it is single and has hole transport ability, electron transport ability, and the luminescent engine performance by itself, or when mixing and using the compound which has each property.

[0078]

Drawing 2 is the sectional view showing other examples in the organic light emitting device of this invention. Drawing 2 is the thing of a configuration of having formed an anode plate 2, the hole transporting bed 5, the electronic transporting bed 6, and cathode 4 one by one on the substrate 1. in this case, photogene -- hole transportability -- or it is useful, when using for each layer the ingredient which has either of the electronic transportability, or both functions and using combining the mere hole transport matter or the electronic transport matter without the luminescence. Moreover, a luminous layer 3 consists in this case of either the hole transporting bed 5 or the electronic transporting bed 6.

[0079]

Drawing 3 is the sectional view showing other examples in the organic light emitting device of this invention. Drawing 3 is the thing of a configuration of having formed an anode plate 2, the hole transporting bed 5, a luminous layer 3, the

electronic transporting bed 6, and cathode 4 one by one on the substrate 1. Since the various compounds which differ in luminescence wavelength can be used while this separating the function of carrier transport and luminescence, and combining it hole transportability, electronic transportability, a compound with each luminescent property; and timely, using it and the degree of freedom of ingredient selection increasing extremely, diversification of a luminescent color phase is attained. Furthermore, it also becomes possible to confine each carrier or an exciton in the central luminous layer 3 effectively, and to aim at improvement in luminous efficiency.

[0080]

Drawing 4 is the sectional view showing other examples in the organic light emitting device of this invention. It is the configuration which inserted the hole impregnation layer 7 in the anode plate 2 side to drawing 3, and drawing 4 has effectiveness in the adhesion improvement of an anode plate 2 and the hole transporting bed 5, or an injectional improvement of a hole, and is effective for low-battery-izing.

[0081]

Drawing 5 and drawing 6 are the sectional views showing other examples in the organic light emitting device of this invention. Drawing 5 and drawing 6 are the configurations which inserted the layer (hole blocking layer 8) which checks escaping from a hole or an exciton (exciton) to a cathode 4 side to drawing 3 and drawing 4 between the luminous layer 3 and the electronic transporting bed 6. By using the very high compound of ionization potential as a hole blocking layer 8, it is a configuration effective for improvement in luminous efficiency.

[0082]

However, drawing 1 - drawing 6 are to the last very fundamental component configurations, and the configuration of the organic light emitting device using the compound of this invention is not limited to these. For example, various lamination -- the hole transporting bed which prepares the glue line or interference layer which prepares an insulating layer in an electrode and an organic layer interface consists of two-layer [from which ionization potential differs] -- can be taken.

[0083]

The compound shown by general formula [1] - [6] used for this invention can be used with any gestalt of drawing 1 - drawing 6.

[0084]

Especially the organic layer using the compound of this invention is useful as a luminous layer, an electronic transporting bed, or a hole transporting bed, and the layer formed by the vacuum deposition method, the solution applying method, etc. is [that crystallization etc. cannot take place easily] excellent in stability with the passage of time.

[0085]

Although the compound shown by general formula [1] - [6] is used especially for this invention as a constituent of a luminous layer, a hole transportability compound, a luminescent compound, or an electronic transportability compound known until now can also be used for it together if needed.

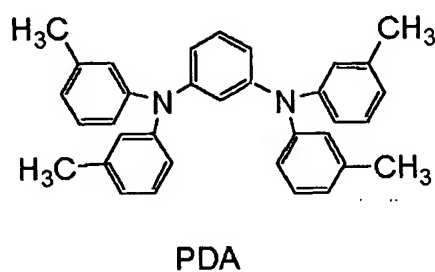
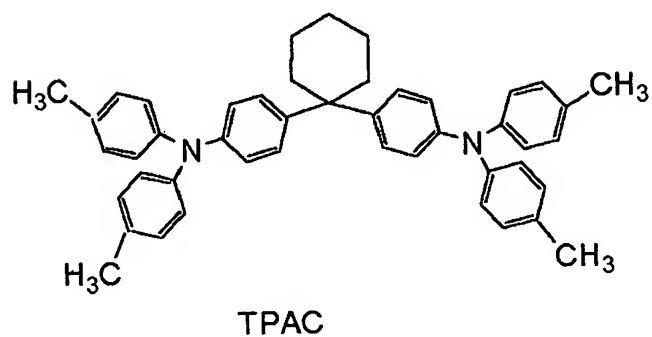
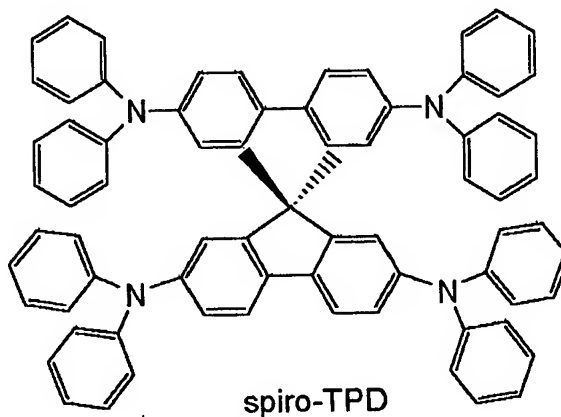
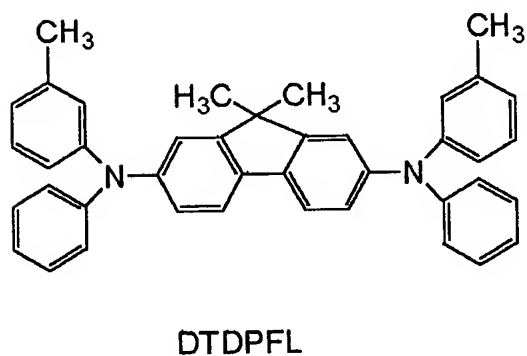
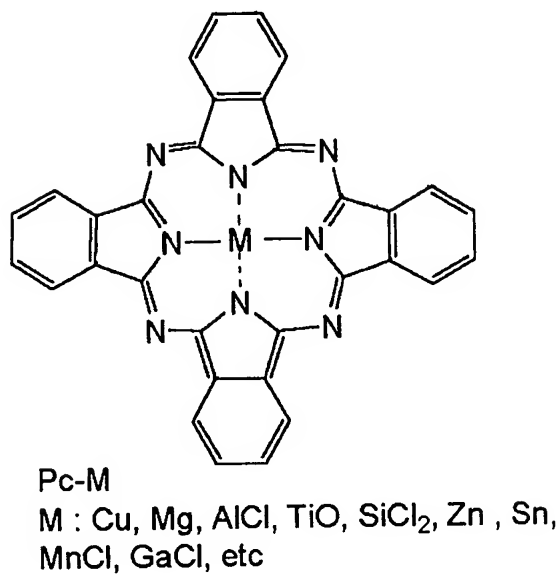
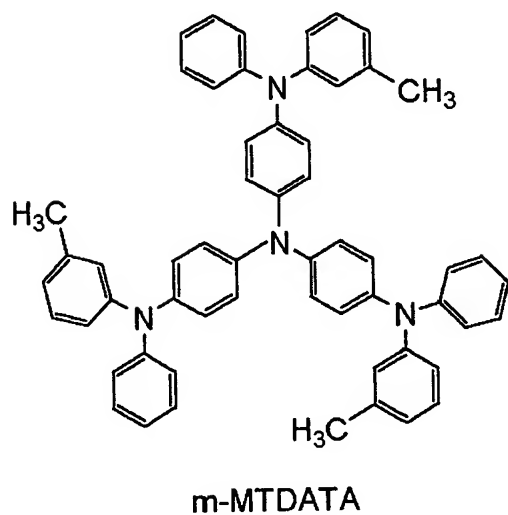
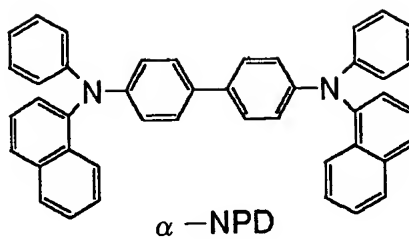
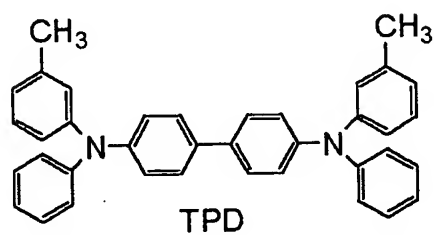
[0086]

These examples of a compound are given to below.

[0087]

[Formula 40]

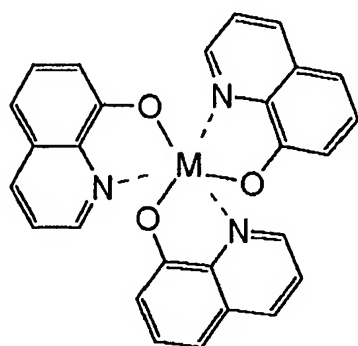
ホール輸送性化合物



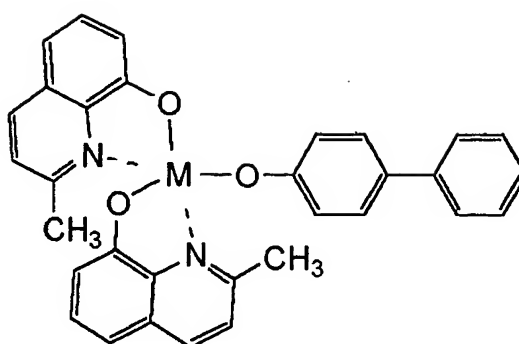
[0088]

[Formula 41]

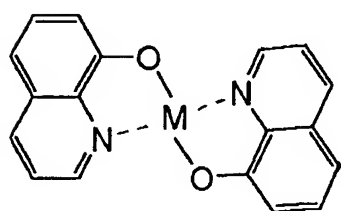
電子輸送性発光材料



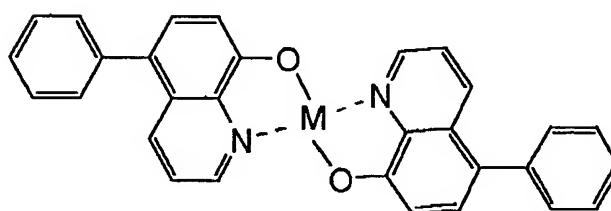
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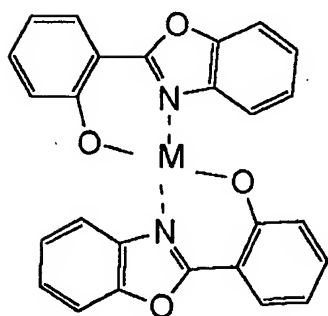
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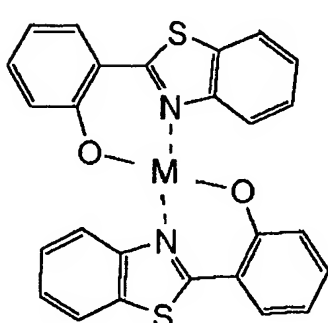
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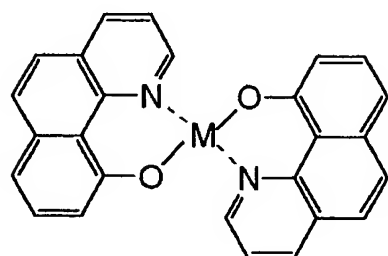
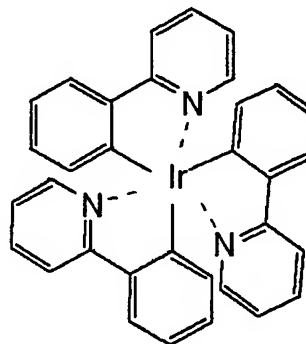
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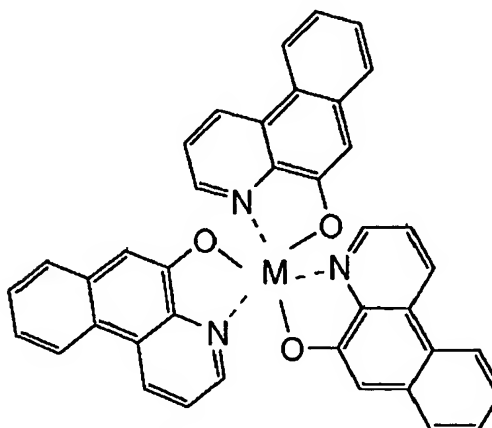
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M : Zn , Mg , Be



M : Zn , Mg , Be

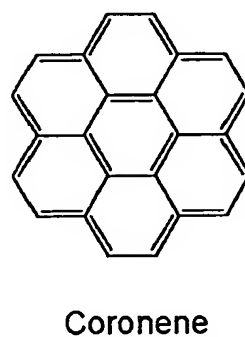
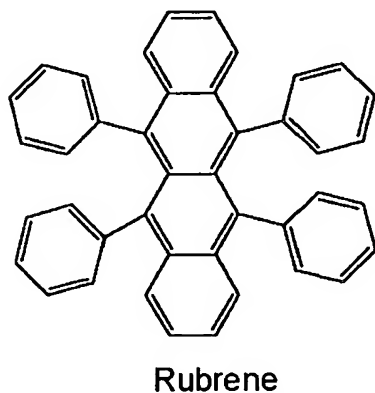
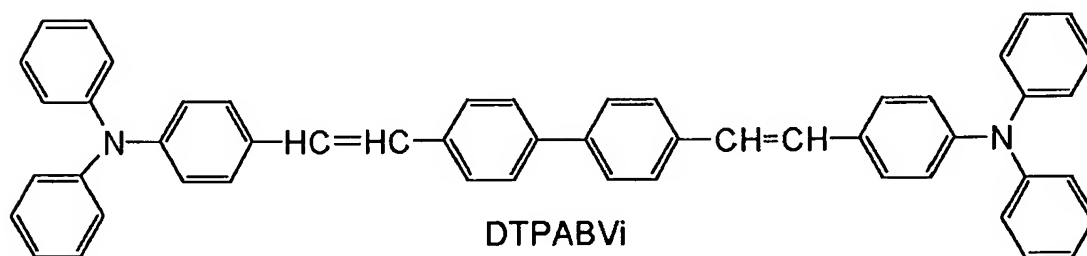
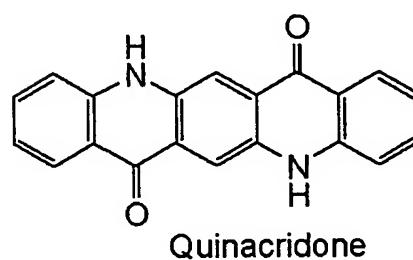
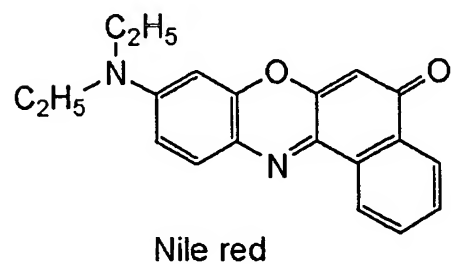
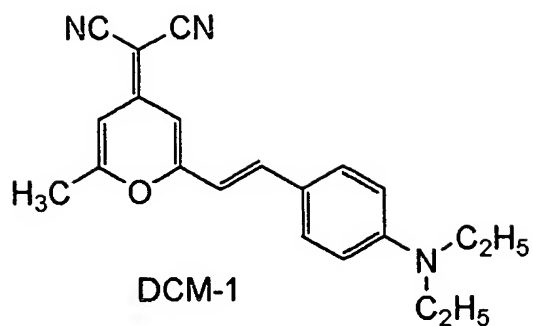
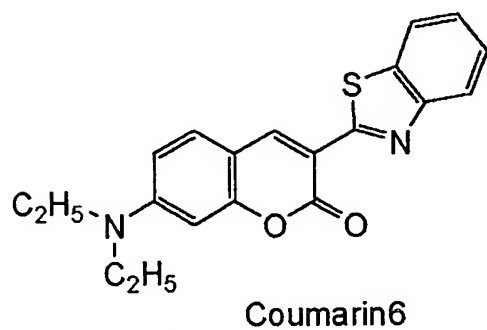


M : Al , Ga

[0089]

[Formula 42]

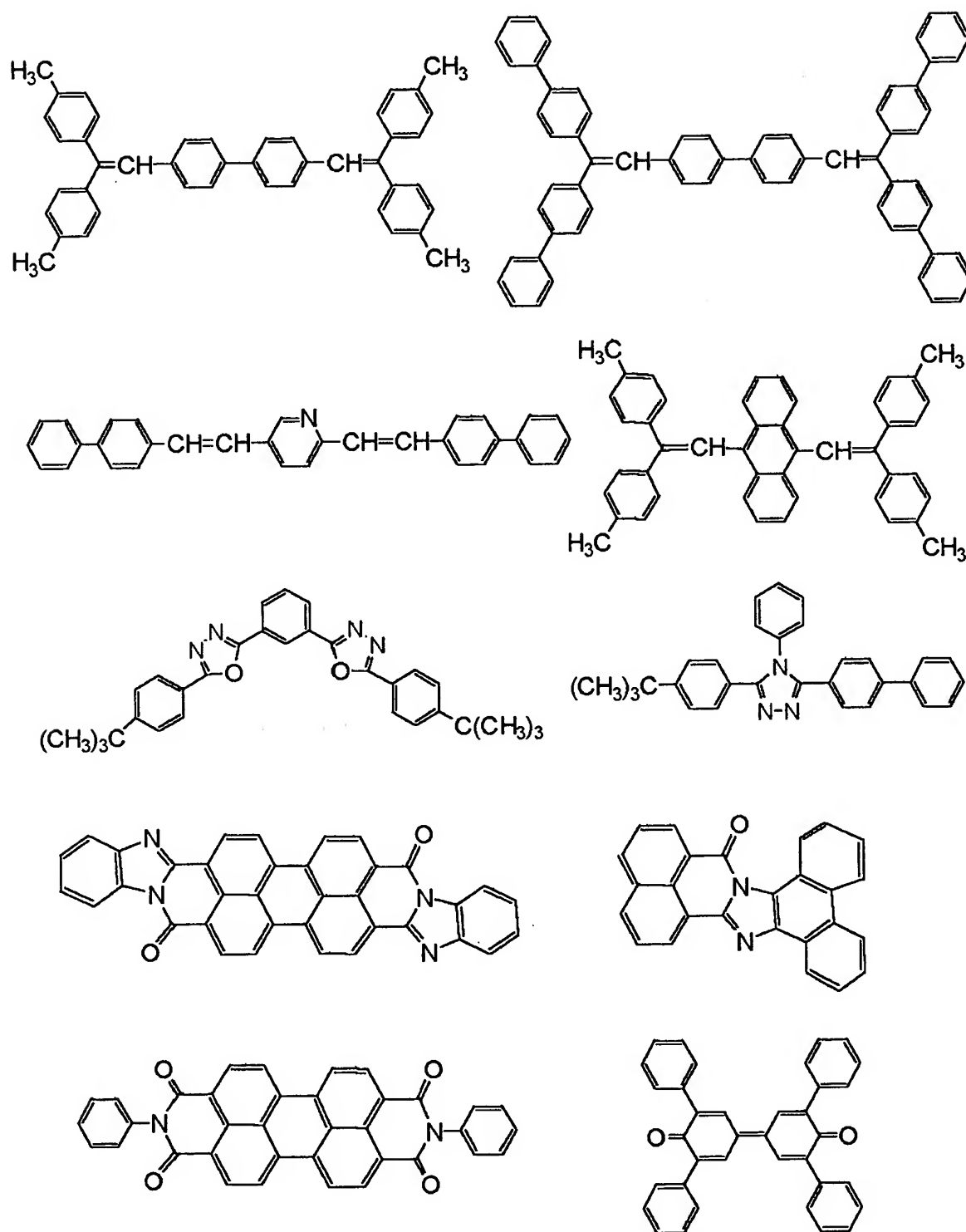
発光材料



[0090]

[Formula 43]

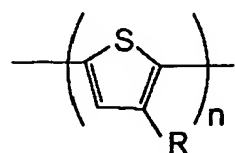
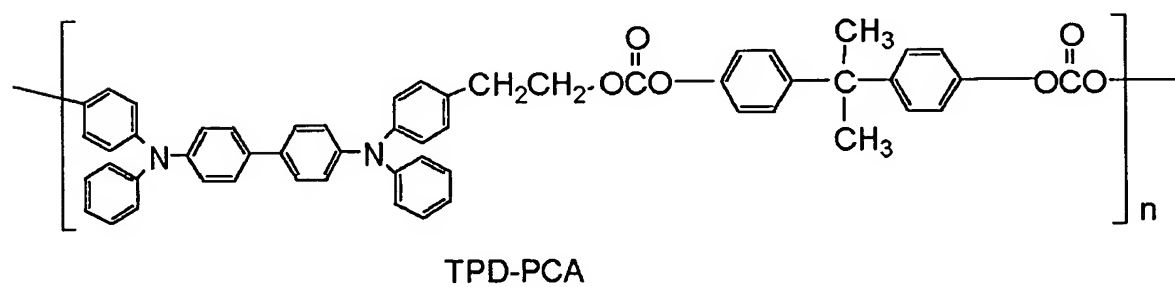
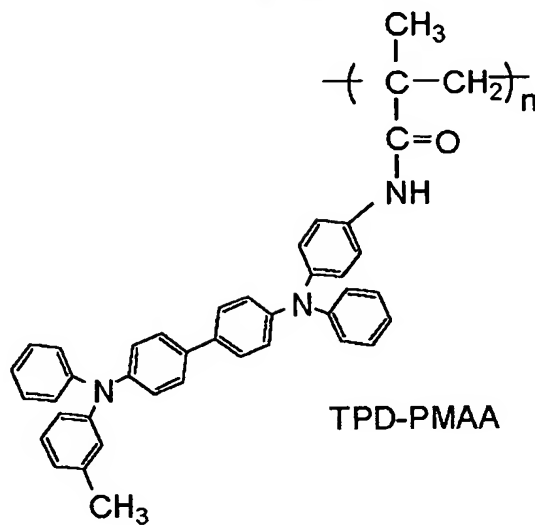
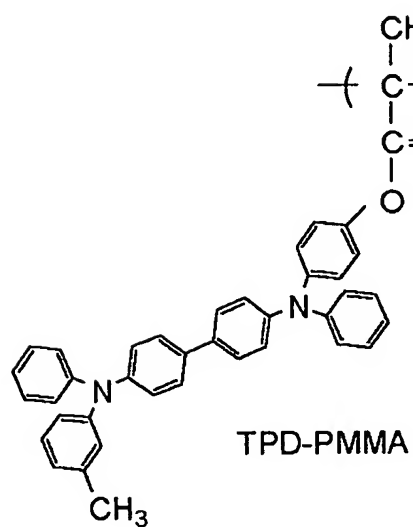
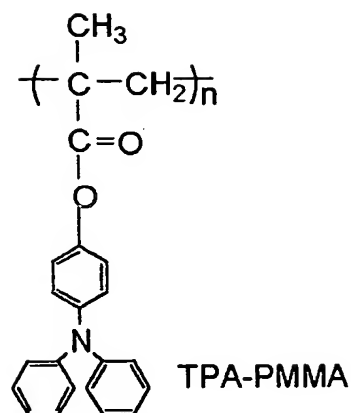
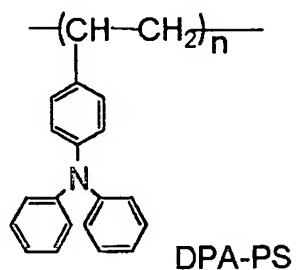
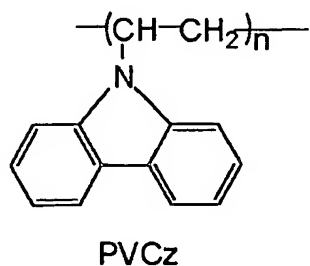
発光層マトリックス材料および電子輸送材料



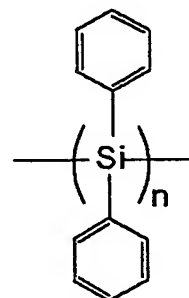
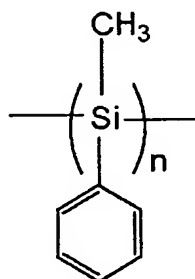
[0091]

[Formula 44]

ポリマー系ホール輸送性材料



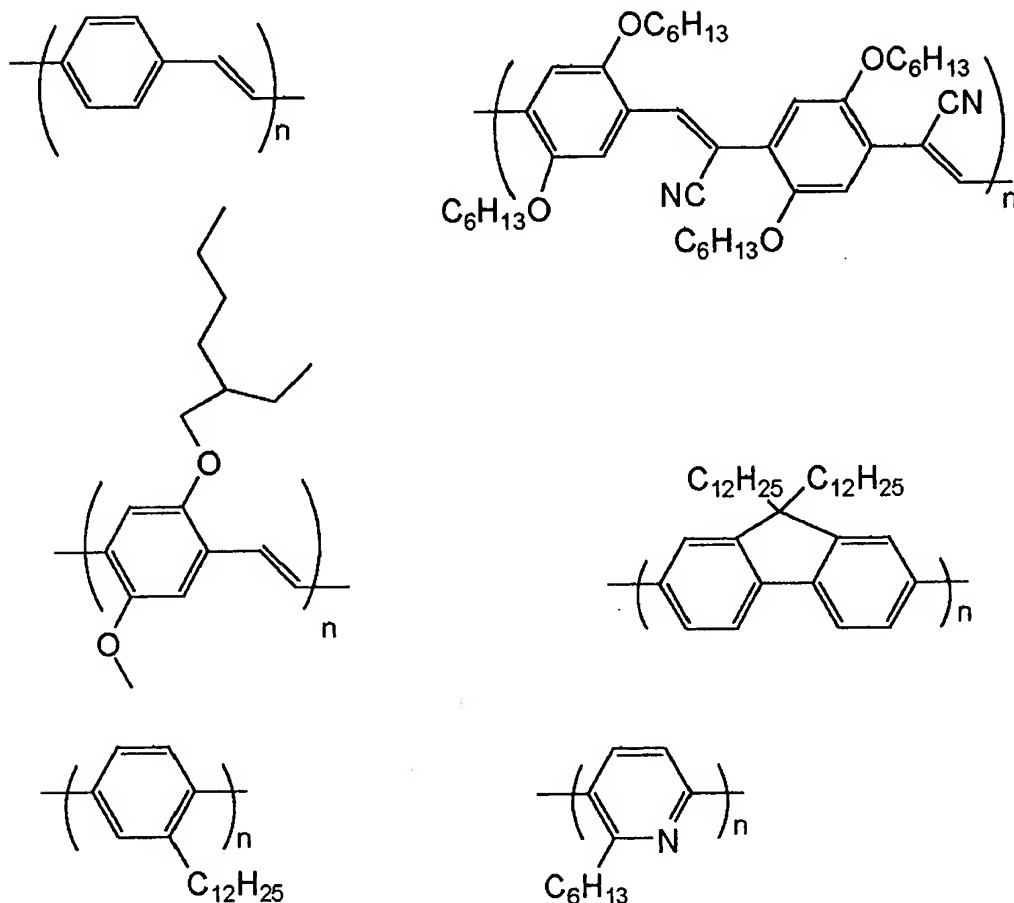
Poly thiophene



[0092]

[Formula 45]

ポリマー系発光材料および電荷輸送性材料



[0093]

In the organic light emitting device of this invention, generally, it is made to dissolve in a vacuum deposition method or a suitable solvent, and the layer which consists of an organic compound of the layer containing the compound shown by general formula [1] - [6] and others forms a thin film by the applying method. When forming membranes especially by the applying method, the film can also be formed combining suitable binding resin.

[0094]

Although it can choose from wide range bending resin as the above-mentioned binding resin, for example, polyvinyl-carbazole resin, polycarbonate resin, polyester resin, polyarylate resin, polystyrene resin, acrylic resin, methacrylic resin, butyral resin, polyvinyl-acetal resin, diallyl phthalate resin, phenol resin, an epoxy resin, silicone resin, polysulfone resin, a urea-resin, etc. are mentioned, it is not limited to these. moreover -- as that these are independent or a copolymer polymer -- one sort -- or two or more sorts may be mixed.

[0095]

As an anode material, what has as big a work function as possible is good, for example, metallic oxides, such as metal simple substances, such as gold, platinum, nickel, palladium, cobalt, a selenium, and vanadium, or these alloys, tin oxide, a zinc oxide, a tin oxide indium (ITO), and a zinc oxide indium, can be used. Moreover, conductive polymers, such as the poly aniline, polypyrrole, the poly thiophene, and a polyphenylene sulfide, can also be used. Such electrode material may be used independently and can also be used together. [two or more]

[0096]

On the other hand, as a cathode material, the small thing of a work function is good and can use as a metal simple substance or two or more alloys, such as a lithium, sodium, a potassium, calcium, magnesium, aluminum, an indium, silver, lead, tin, and chromium. Utilization of metallic oxides, such as a tin oxide indium (ITO), is also possible. Moreover, a configuration is much more sufficient as cathode, and it can also take a multilayer configuration.

[0097]

Especially as a substrate used by this invention, although it does not limit, transparency substrates, such as opaque substrates, such as a metal substrate and a substrate made from the ceramics, glass, a quartz, and a plastic sheet, are used. Moreover, it is also possible to use the light filter film, the fluorescence color conversion filter film, the dielectric reflective film, etc. for a substrate, and to control coloring light.

[0098]

In addition, to the created component, a protective layer or a closure layer can also be prepared in order to prevent contact with oxygen, moisture, etc. As a protective layer, a photo-setting resin etc. is mentioned to poly membranes, such as inorganic material film, such as a diamond thin film, a metallic oxide, and a metal nitride, a fluororesin, poly paraxylene, polyethylene, silicone resin, and polystyrene resin, and a pan. Moreover, glass, a gas impermeable film, a metal, etc. can be covered and packaging of the component itself can also be carried out with suitable closure resin.

[0099]

[Example]

Hereafter, although the example explains this invention still more concretely, this invention is not limited to these.

[0100]

<Example 1>

It created by the approach of showing below the organic light emitting device of the structure shown in drawing 3.

[0101]

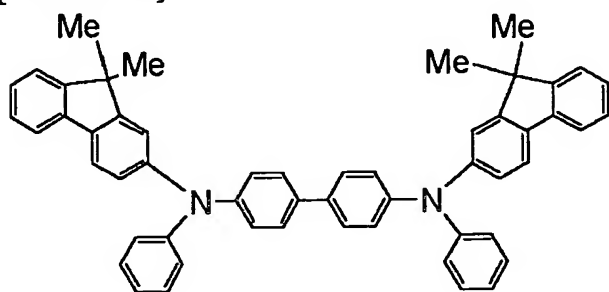
On the glass substrate as a substrate 1, what formed the tin oxide indium (ITO) as an anode plate 2 by 120nm thickness in the spatter was used as a transparent conductive support substrate. Sequential ultrasonic cleaning of this was carried out by the acetone and isopropyl alcohol (IPA), and boiling washing and desiccation were carried out by IPA. Furthermore, what carried out UV / ozone washing was used as a transparent conductive support substrate.

[0102]

Using the compound shown with the following structure expression as an electron hole transport ingredient, the chloroform solution was adjusted so that concentration might become 0.5wt(s)%.

[0103]

[Formula 46]



[0104]

This solution was dropped on the above-mentioned ITO electrode (anode plate 2), first, by the revolution of 500RPM, for 10 seconds, it performed, the spin coat was performed for 1 minute, and film formation was carried out by the revolution of 1000RPM next. It dried in 80-degree C vacuum oven for 10 minutes after this, and the solvent in a thin film was removed thoroughly. The thickness of the formed TPD film (hole transporting bed 5) was 50nm.

[0105]

Next, on the hole transporting bed 5, vapor codeposition of said instantiation compound No.[1]-6 and said instantiation

compound No.[2]-1 (weight ratio 5:100) was carried out, and the 20nm luminous layer 3 was formed. The degree of vacuum at the time of vacuum evaporatio no formed 1.0×10 to 4 Pa, and a membrane formation rate on condition that 0.2 - 0.3 nm/sec.

[0106]

Furthermore, aluminum quinolinol (Alq3) was formed in 40nm thickness with the vacuum deposition method as an electronic transporting bed 6. The degree of vacuum at the time of vacuum evaporatio no of these organic layers was 1.0×10 to 4 Pa, and membrane formation rates were the conditions of 0.2 - 0.3 nm/sec.

[0107]

Next, using the vacuum evaporatio no ingredient which consists of an aluminium-lithium alloy (lithium concentration 1 atom %), the metal layer membrane with a thickness of 10nm was formed with the vacuum deposition method on the organic layer like the point, the aluminum film with a thickness of 150nm was further prepared with the vacuum deposition method, and the organic light emitting device which makes the aluminium-lithium alloy film an electronic notes telegram pole (cathode 4) was created. The degree of vacuum at the time of vacuum evaporatio no formed 1.0×10 to 4 Pa, and a membrane formation rate on condition that 1.0 - 1.2 nm/sec.

[0108]

The obtained organic EL device put the glass plate for protection in the dry air ambient atmosphere, and closed it with the acrylic resin system binder so that component degradation might not take place by adsorption of moisture.

[0109]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 1250 cd/m², the highest brightness of 3770 cds/m², and luminous efficiency 0.45 lm/W was observed with the applied voltage of 9V.

[0110]

<Examples 2-7>

Instantiation compound [1] It replaced with -6, and the instantiation compound shown in a table 6 was used, and also the component was created like the example 1, and same assessment was performed. The result is shown in a table 6.

[0111]

[A table 6]

実施例	例示化合物 No.	印加電圧 (V)	輝度 (cd/m ²)	最高輝度 (cd/m ²)	効率 (lm/W)
2	[1]-34	9	1670	5200	0.60
3	[1]-41	8	1840	6150	0.65
4	[1]-46	9	1730	5480	0.60
5	[1]-57	9	2050	6990	0.67
6	[1]-64	8	2200	7270	0.72
7	[1]-66	8	2600	7700	0.85

[0112]

<Example 8>

Said instantiation compound No.[1]-41 and said instantiation compound No. [2] The component was created like the example 1 except having carried out vapor codeposition of -15 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0113]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li

electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 1680 cd/m², the highest brightness of 4650 cds/m², and luminous efficiency 0.57 lm/W was observed with the applied voltage of 9V. [0114]

<Example 9>

Instantiation compound No. [1] Replaced with -41, and instantiation compound No.[1]-57 were used, and also the component was created like the example 8.

[0115]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 1850 cd/m², the highest brightness of 4950 cds/m², and luminous efficiency 0.58 lm/W was observed with the applied voltage of 9V.

[0116]

<Example 10>

Said instantiation compound No.[1]-41 and said instantiation compound No. [3] The component was created like the example 1 except having carried out vapor codeposition of -1 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0117]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 2150 cd/m², the highest brightness of 6840 cds/m², and luminous efficiency 0.71 lm/W was observed with the applied voltage of 8V.

[0118]

<Example 11>

Instantiation compound [1] Replaced with -41, and instantiation compound No.[1]-39 were used, and also the component was created like the example 10.

[0119]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 2370 cd/m², the highest brightness of 7320 cds/m², and luminous efficiency 0.73 lm/W was observed with the applied voltage of 8V.

[0120]

<Example 12>

Said instantiation compound No.[1]-46 and said instantiation compound No. [4] The component was created like the example 1 except having carried out vapor codeposition of -1 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0121]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 2200 cd/m², the highest brightness of 6760 cds/m², and luminous efficiency 0.72 lm/W was observed with the applied voltage of 8V.

[0122]

<Example 13>

Said instantiation compound No.[1]-41 and said instantiation compound No. [5] The component was created like the example 1 except having carried out vapor codeposition of -2 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0123]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 3100 cd/m², the highest brightness of 7250 cds/m², and luminous efficiency 1.02 lm/W was observed with the applied voltage of 8V.

[0124]

<Example 14>

Said instantiation compound No.[1]-39 and said instantiation compound No. [5] The component was created like the example 1 except having carried out vapor codeposition of -9 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0125]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 4500 cd/m², the highest brightness of 8420 cds/m², and luminous efficiency 1.18 lm/W was observed with the applied voltage of 8V.

[0126]

<Example 15>

Said instantiation compound No.[1]-57 and said instantiation compound No. [6] The component was created like the example 1 except having carried out vapor codeposition of -1 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0127]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and blue luminescence of luminescence brightness 1980 cd/m², the highest brightness of 5300 cds/m², and luminous efficiency 0.60 lm/W was observed with the applied voltage of 9V.

[0128]

<Examples 16-21>

The emission spectrum of the component created in the examples 2, 5, 10, 12, 14, and 15 was observed by MCPD-7000, and the CIE chromaticity coordinate was measured. The result is shown in a table 7.

[0129]

[A table 7]

実施例	素子の実施例	CIE 色度座標 (x,y)
16	2	0.15,0.07
17	5	0.15,0.10
18	10	0.15,0.09
19	12	0.15,0.10
20	14	0.16,0.11
21	18	0.15,0.10

[0130]

<Example 22>

When current density was maintained at 7.0 mA/cm² under nitrogen-gas-atmosphere and the electrical potential difference was impressed to the component created in the example 13 for 100 hours, 410 cd/m² and brightness degradation were small 100 hours after initial brightness 480 cd/m².

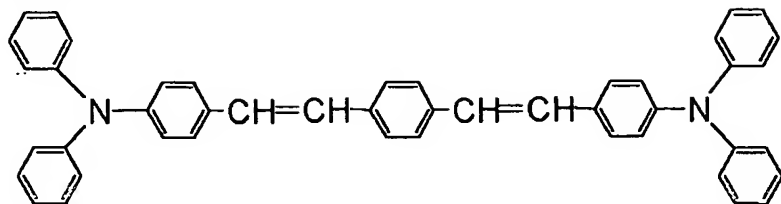
[0131]

<The example 1 of a comparison>

The component was created like the example 1 except having used the following styryl compound as a luminous layer 3.

[0132]

[Formula 47]



[0133]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and luminescence of the blue white which the greenishness of the luminescence brightness of 120 cds/m², highest brightness 3800 cd/m², and luminous efficiency 0.17 lm/W cut with the applied voltage of 10V was observed.

[0134]

<The example 2 of a comparison>

The above-mentioned styryl compound and said instantiation compound [4] The component was created like the example 1 except having carried out vapor codeposition of -1 (weight ratio 5:100), and having formed the 20nm luminous layer 3.

[0135]

Thus, the ITO electrode (anode plate 2) was used the obtained component, the positive electrode and the aluminum-Li electrode (cathode 4) were used as the negative electrode, and luminescence of the blue white which the greenishness of the luminescence brightness of 125 cds/m², highest brightness 4500 cd/m², and luminous efficiency 0.30 lm/W cut with the applied voltage of 10V was observed.

[0136]

<The example 3 of a comparison>

When the emission spectrum of the component created in the example 2 of a comparison was observed by MCPD-7000 and the CIE chromaticity coordinate was measured, it was = (x y) (0. 16 0.30).

[0137]

[Effect of the Invention]

applied voltage with the organic light emitting device above low as a monolayer or a mixing layer of a dopant/host like explanation using the compound shown by general formula [of this invention] [1] - [6] -- high -- brightness luminescence is obtained and it excels also in color purity and endurance. Furthermore, it can create using vacuum deposition or the casting method, and creation of a component is also comparatively cheap and can create the component of a large area easily.

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing an example of the organic light emitting device in this invention.

[Drawing 2] It is the sectional view showing other examples of the organic light emitting device in this invention.

[Drawing 3] It is the sectional view showing other examples of the organic light emitting device in this invention.

[Drawing 4] It is the sectional view showing other examples of the organic light emitting device in this invention.

[Drawing 5] It is the sectional view showing other examples of the organic light emitting device in this invention.

[Drawing 6] It is the sectional view showing other examples of the organic light emitting device in this invention.

[Description of Notations]

1 Substrate

2 Anode Plate

3 Luminous Layer

4 Cathode

5 Hole Transporting Bed

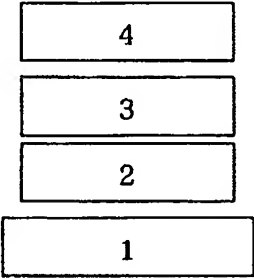
6 Electronic Transporting Bed

7 Hole Impregnation Layer
8 Hole / Exciton Blocking Layer

[Translation done.]

Drawing selection

drawing 1



[Translation done.]

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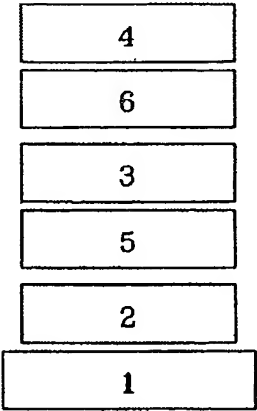
Drawing selection

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6
5
2
1

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Drawing selection



[Translation done.]

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6
3
5
7
2
1

[Translation done.]

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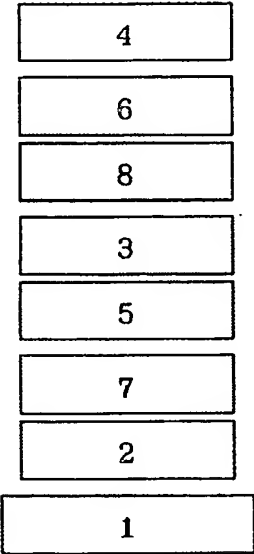
Drawing selection drawing 5

4
6
8
3
5
2
1

[Translation done.]

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Drawing selection drawing 6



[Translation done.]

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